Working Material

The Regulatory Authority Information System

RAIS 3.0 with SQL Server Extensions

Programmer's Guide

Part I – Advanced Customization

Document version 1/12/2006

Contents

1 Introduction 1
1.1 Overview 1

2 RAIS Advanced Customizations 4
2.1 Creating Custom Protectors 4
2.2 Creating Custom Evaluators 11
2.3 Creating Custom Consistency Checks 16
2.4 Creating Custom Preselection Values 21
2.5 Creating Custom combo box contents 22
2.6 Creating Custom Preselection lists 24
2.7 Creating Custom Functions and Modules 25
2.8 Creating Custom Forms 29
2.9 Creating Custom Tables 30
2.10 Creating Custom Menu entries 31
2.11 Creating Custom Queries and Statistics 38
2.12 Customizing Search Functionality 43
2.13 Multiple selection (junction forms) 44

3 Copying customizations from a front-end to the creator 46
3.1 Copying Queries 46
3.2 Copying forms and reports 47
3.3 Copying tables 49
3.4 Copying modules 50

4 Entity Relationship Diagrams 51
4.1 Facilities and Departments 52
4.2 Sources 53
4.3 Authorizations 55
4.4 Workers 57
4.5 Inspections 57
4.6 Enforcements 58
4.7 Incidents 58
4.8 Service Providers 59

1 Introduction

This document is part of the official programmer's guide of RAIS 3.0 with SQL Extensions, released May 2006. This part is intended to assist RAIS 3.0 Administrators and Developers in advanced customizations of RAIS 3.0.

1.1 Overview

The programmer's guide consists of two parts:

- Part I: Advanced customizations
- Part II: Technical details

Part I (Advanced customizations) details how highly specialized functionality may be included in RAIS 3.0. Part II (Technical details) gives an overview of internal functioning of the RAIS Creator.

1.1.1 General approach for advanced customization

The RAIS 3.0 system is defined through a set of tables, fields inside tables and relationships between tables. The user interface is a combination of forms and queries to allow data input and data retrieval from the tables. Complementary parts of the system consist of modules of Visual Basic code.

Customization of the RAIS 3.0 model and interface is possible to a certain extend through the interface or through the creator (see RAIS 3.0 Administrator Guide). Advanced customization can be performed through the modification of existing objects (tables, queries, forms) or through the addition of new objects.

The description of the main types of tables are given in the following table

Type of table	Description, Content
Data tables	contain defaults values for selection menus or input data;
Evaluator tables	contain IDs of system data that match a certain condition (for example primary key of Boolean record that means "yes"), is used by system for consolidation and queries
Propagator tables	link data with forms by IDs, determines which queries to be shot when a form opens, are responsible for how data looks in a form or report;
Protector tables	contain primary keys of specific data to be protected against deletion or renaming and error message text;
System tables	contain local system settings, search tool SQL expressions, system error messages;
Treeview	determines the contents of the tree-view menu;

The descriptions of the main types of queries are given in the following table.

Type of query	**Description, Function**
Allocation –	Is used by the system (forms with multiple selection), are system queries that normally don't need to be modified
Calculation –	Queries that contain any type of mathematical calculation (e.g. current activity of an isotope)
Consistency Check –	Checks whether data entered by user meets the defined validation rule
Display –	Return records that are currently being displayed, used further in queries
Entry Filter –	Determine a recordset that should appear in a drop-down (combo) box
Helper –	Helper queries that are used when its hard to obtain the needed data with one SQL query
Item Selection –	System query that normally don't need to be modified
Menu Selection –	Reads current location of the user in the interface
Mini Display –	Contains all the data to be shown in main window, later to be filtered by "Preselection List –" query
Preselection Filter –	Used to fill drop-down boxes, contain two fields: ID and one more
Preselection List –	Reads the values chosen by the user in menus and filters records to show
Query –	One of the most relevant types for customization (together with statistics) – displays list of items (report) based on user choices (e.g. facilities w/o authorization)
Statistics –	One of the most relevant types for customization (together with query-type) – displays counts of items (report) based on user choices (e.g. number of facilities w/o authorization)
UnAllocation –	Is used by the system (forms with selection and assignment of multiple values). System query that normally don't need to be modified

The general approach for advanced customization is:

- Design, test and validate custom objects (forms, queries etc.) in an unlocked RAIS 3.0 front-end:

  Testing and validation is most efficiently done directly in an unlocked RAIS 3.0 front-end. This allows for immediate testing of the new objects in their final environment. Please refer to section 4 in the RAIS Administrator Guide for instructions about how to create an unlocked front-end.

- Copy custom objects into the RAIS 3.0 Creator:

  After custom objects have been validated, they need to be copied into the RAIS Creator in order to be automatically included in the RAIS 3.0 front-end upon next creator runs. If custom objects would not be copied into the creator, they clearly would be lost.

- Eventually adjust the RAIS 3.0 Creator to automatically create new custom objects upon next run:

  For some objects to be fully integrated into the RAIS 3.0 front-end, slight modifications of the RAIS 3.0 Creator source code and record appending in RAIS 3.0 System Tables are required. Please refer to Section 3 for more details on how to copy custom objects into the creator and how to adjust the creator.

The following notes are important pre-requisites before doing any advanced customization of RAIS 3.0

- It is important to be familiar with the RAIS 3.0 system and its associated documentation before doing any customization.

- To make an unlocked front-end, select the appropriate option before running the creator.

- To open the creator in design mode, hold down the "shift" key when clicking the "OK" button on the Logon window.

1.1.2 Structure of the document

Section 2 details how advanced customizations may be implemented in RAIS, as for example specialized queries and reports, new forms and functions. RAIS administrators will find most of required information in this section. The reader is required to be familiarized with Visual Basic for Applications (VBA) and Structured Query Language (SQL).

2 RAIS Advanced Customizations

This section describes advanced customization of RAIS 3.0. The RAIS 3.0 Creator has been designed to allow for customizations of the RAIS 3.0 back-end (i.e. adding tables and fields) and appropriately adjusting the RAIS 3.0 Input Forms. Advanced customizations, for example new queries or new consistency checks, require manual intervention on parts of the RAIS 3.0 Creator Source Code as well as RAIS 3.0 System Tables.

2.1 Creating Custom Protectors

Protectors are data tables of a special type used in RAIS 3.0 to prevent deletion of records required for the good and deterministic functioning of the RAIS 3.0 Interface. Examples of such records are all [unknown] records; these exist in the tables [Generator Model], [Generator Type], [Manufacturers] and many more. These records exist in the default values database of RAIS 3.0, distributed by the IAEA.

Protectors allow for preventing deletion by simply creating a record in a protection table and making this record point (by means of a foreign key) to the record to be protected in some other table. As foreign keys have to be entered for protection, it is clear that a protection table has to be set up for each table containing records to be protected.

Protectors are stored in tables as for instance [Protector Generator Type], which has the following table definition:

PK Protector Generator Type ID	Primary key, auto-number
FK Generator Type ID	Primary key of the record in the table [Generator Type] to be protected
Deleting Text	Error text to be displayed when deletion is attempted
Renaming Text	Warning text to be displayed when modification is engaged
Operation Code	Unused (insert 1 if you create new record)
RAIS_TIME_STAMP	Time stamps automatically updated by RAIS, do not touch

Protectors have a foreign key relating a record to be protected in a RAIS table, in this example the table [Generator Type]. Protected records in this table may not be deleted, upon an attempt, the corresponding deleting text is displayed as an error message, and deletion is aborted. To prevent unattended renaming of protected records, the feature for displaying a warning text upon modification has been provided. Modification of protected records is however allowed.

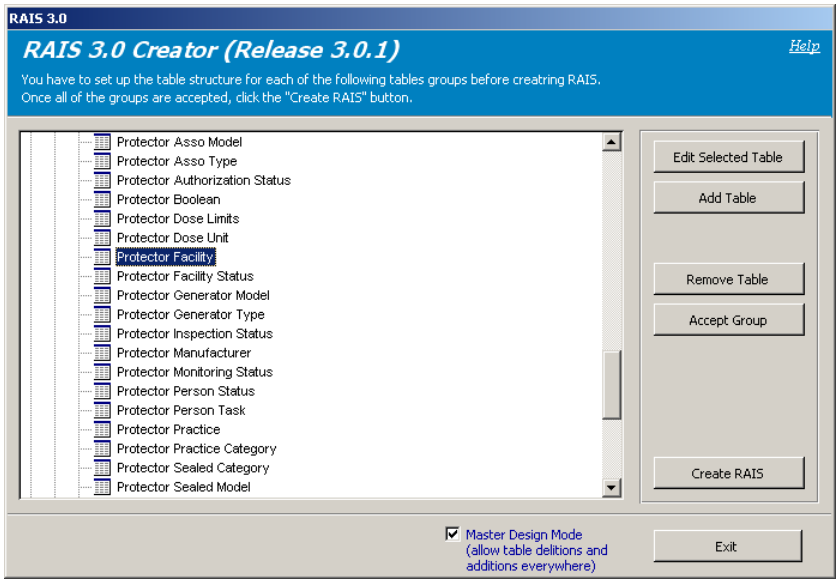
2.1.1 Examples

2.1.1.1 Protecting deletion of important facilities

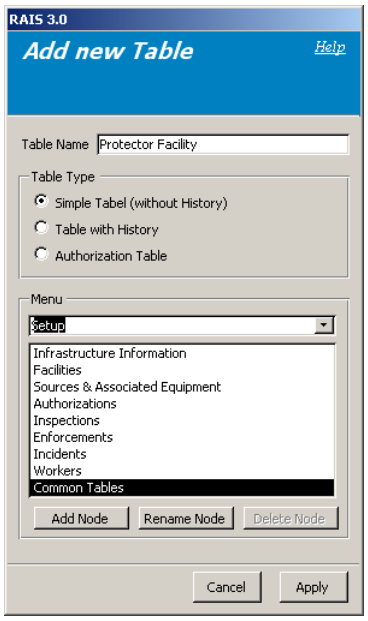
This example shows how to prevent deletion of an important facility, called *Waste Management*. This type of facility will be required in most countries to allow for storage of sources managed as waste.

The standard installation of RAIS 3.0 does not provide for a protector table for facilities. So, in a first step, we have to create this table. If the table has already been created in an earlier step, we may of course skip this section and continue at.

Please make the field [Design Master] visible in the main form of the creator. To do so, open the RAIS Creator in design mode, open the form [Model] in design mode and set the visibility property of the control [Master Design]. Next, close the creator, and open it again in normal mode, activate the ***Master Design Mode*** by ticking the corresponding box.



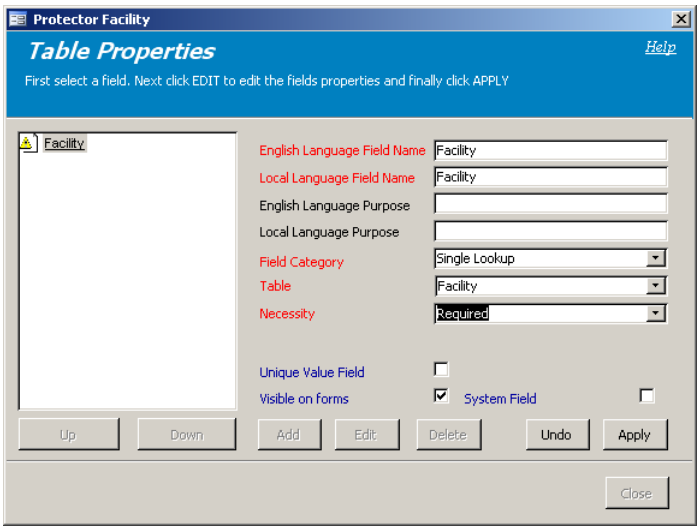
Then select and expand the group node ***Common Tables*** and click the button ***Add Table***.



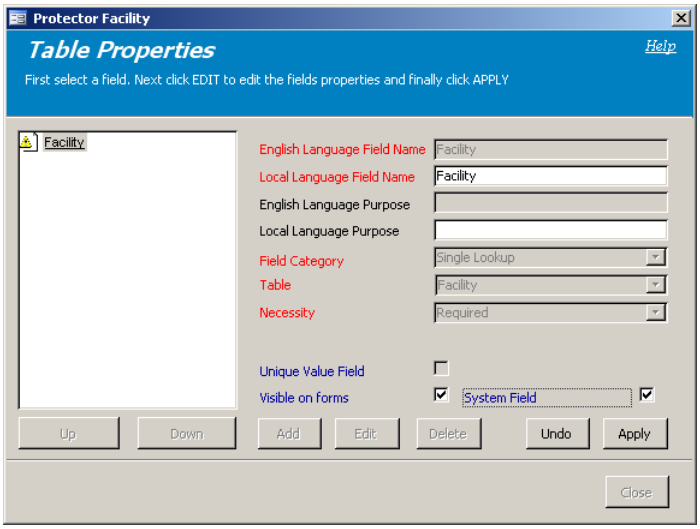
Enter the protector table name [*Protector Facility*], select the option ***Simple Table (without History)***, select the menu ***Setup*** and the menu node ***Common Tables*** and click ***Apply***. The new table will be displayed in the creator form.

Select the table [***Protector Facility***], click the button ***Edit Selected Table*** and add the following fields. Please take utmost care to respect below field ordering:

Create the field **Facility**. Please enter only field definitions and take care to select the option ***System Field*** after you have entered all field attributes.

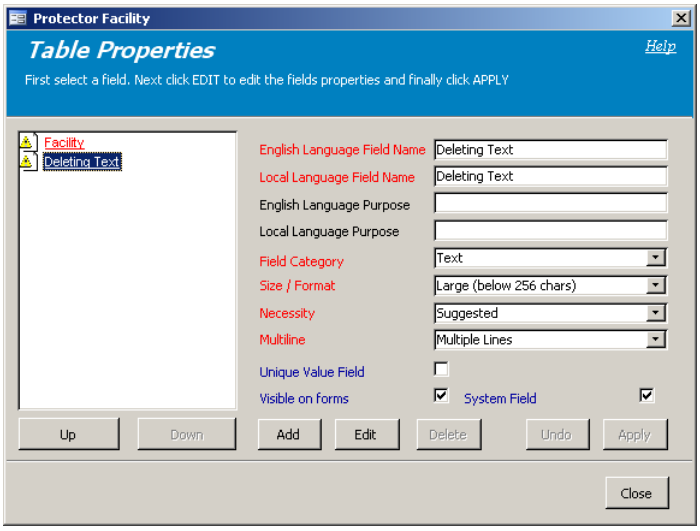


Please note that some fields turn disabled after system field option has been activated.

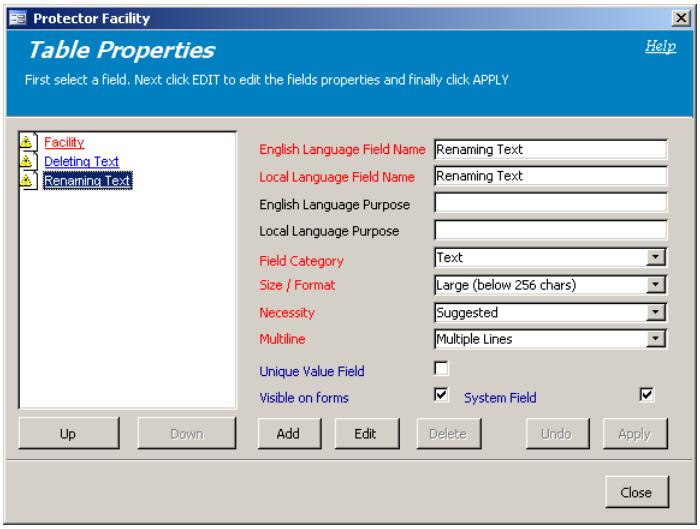


This is to prevent unintended modification of system fields. If you need to correct field attributes, disable the system field option, modify appropriately and enable the system field option again. Click the ***Apply*** button to continue.

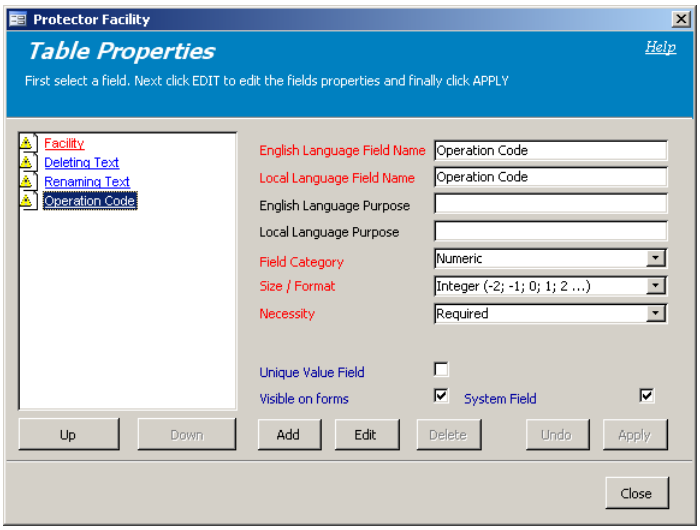
Create the field **Deleting Text**. Please check spelling and system field option.



Create the field **Renaming Text**. Please check spelling and system field option.

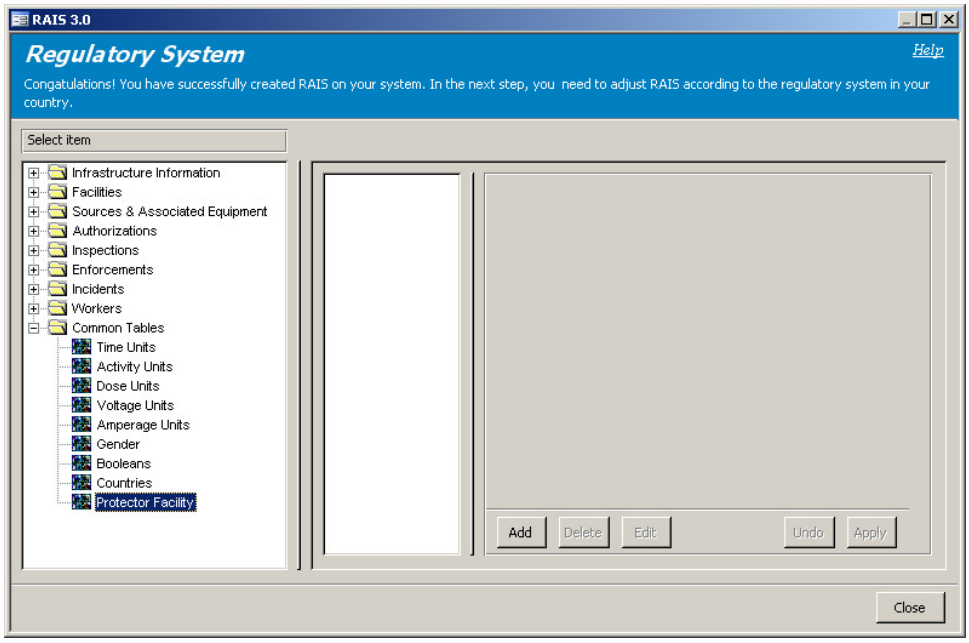


Create the field **Operation Code**. Please check spelling and system field option.

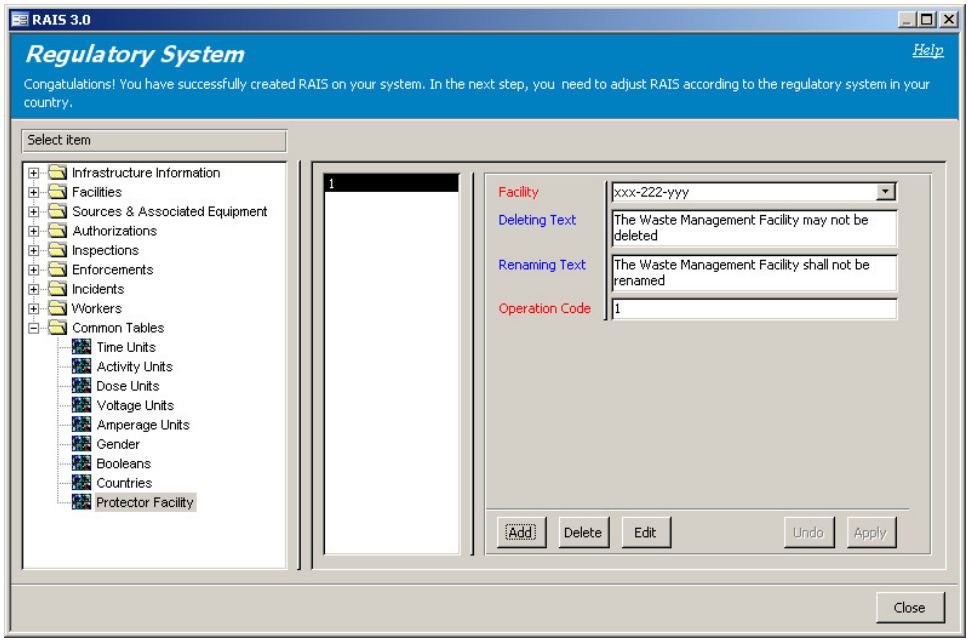


Close the table properties form in order to return to the RAIS Creator main form. Accept the table group and create a new RAIS 3.0 front-end **and** back-end. Please take care to create an **unlocked** front-end.

Open the RAIS 3.0 front-end after creation has been completed. Expand the menu node ***Common Tables*** in the ***Regulatory System*** menu; the new protector appears.

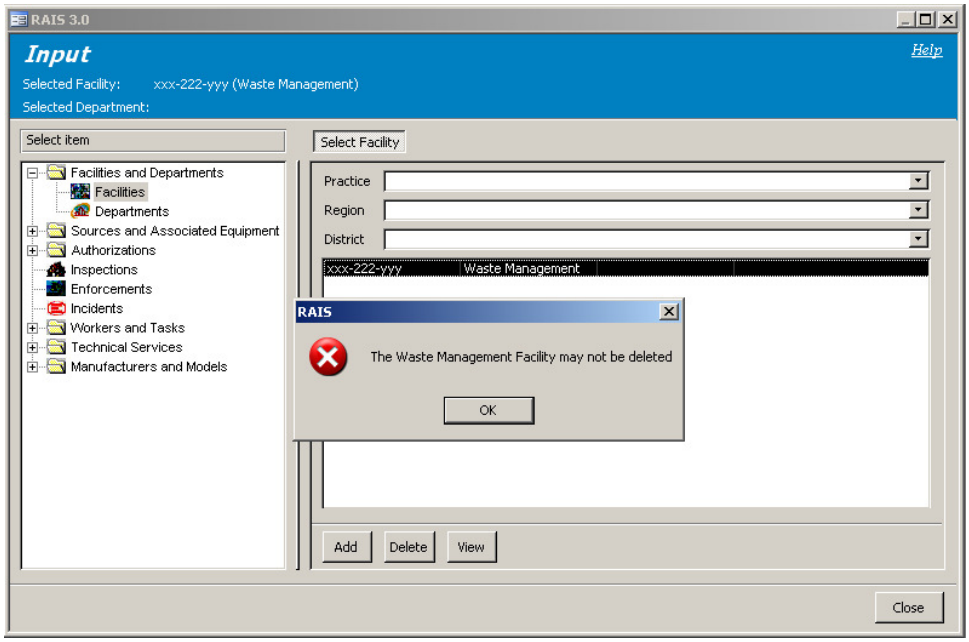


It's empty, of course, we only created the table. Next step is to populate our new protector. Navigate to the protector and click the Add button to create a new protecting record, just as if you create any other new record in RAIS and add "1" to the field "Operation Code".

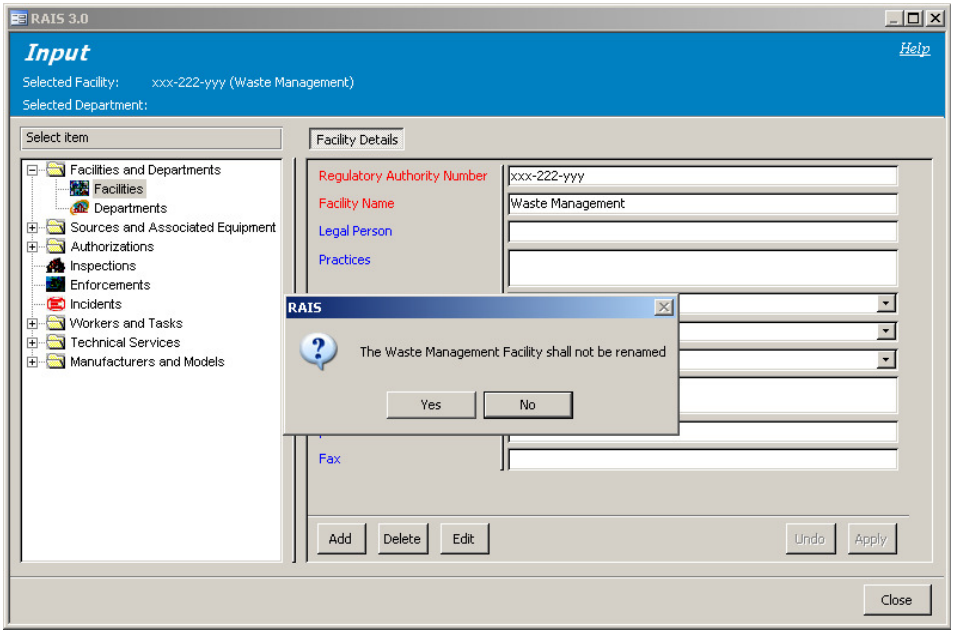


After the new protection record has been created, the left side list box displays by default the primary key value of the facility to be protected. If you want the facility name to be displayed here, please create a new preselection list query for the form [Protector Facility] (see section 2.6)

To test that your protection is working, navigate to the waste management facility in the Input menu and try to delete it. You should have the following screen:



Test also the behavior when modifying the record.



Please note that only a warning message is displayed, hence modifications are allowed.

2.1.2 Hiding protector tables from the Regulatory System menu

The new protector we have been creating appears in the ***Regulatory System*** menu. Protectors defined by default in the standard version of RAIS 3.0 are not displayed; they are hidden. This hiding feature has been introduced because it might be dangerous to modify, or even delete protector records.

After we have defined and validated our new protector, we should also protect this protector by hiding it from the ***Regulatory System*** menu. Open the table [**Treeview**] in the RAIS back-end. Search for the record having the field value [Protector Facility] in the field [PDI]. Lookup the associated value of the field [Key]; it will usually be something starting with the

letter M. This letter makes the menu node for our protector appear under the menu group ***Common Tables***. A hidden menu group exists in RAIS for hiding all protectors, having the key prefix Y. Rename the key of the new protector to something like Y99, meanwhile taking care that this key is not yet used.

2.1.3 Comments

It is allowed to extend the table definition of protectors to include for instance a category of facilities to be protected. Values for this category could be Management or Administration. However, the basic field mentioned above must exist for protection to be executed upon record operations.

Although such extensions are possible, it is highly recommended to move fields such as above mentioned category field to the RAIS tables (in above example the facility). The preselection lists for the form [Protector Facility] may then be extended in such a way to include that category field (see section 2.6).

Protectors may be created to protect for deletion of departments, instead of facilities. This would prevent for direct deletion of protected departments, of course, but not for cascaded deletions by deleting the facilities protected departments belong to. To avoid cascaded deletions, protectors must be created for both facilities and departments. Cascaded deletions have to be considered when protecting any information items.

Note
We have defined the protector for protecting the waste management facility to be called [Protector Facility]. We did not call it [Protector Waste Management] as it might be useful to protect other facilities as well. Records for those facilities may simply be appended to this protector, and the naming convention still is meaningful and correct.
Take utmost care not to introduce duplicate key values. Take care that all key values must comply with the format L99, a letter followed by two digits.

2.2 Creating Custom Evaluators

Some records in RAIS 3.0 have special functions, and the existence of those records is required for the good functioning of RAIS 3.0. Examples of such records are all [unknown] records; these exist in the tables [Generator Model], [Generator Type], [Manufacturers] and many more. These records exist in the default values database of RAIS 3.0, distributed by the IAEA. [unknown] records have a primary key value of 1 in the default value database of the IAEA. Queries could then use a filter value of 1 to retrieve all generators where the model is unknown:

```
Select * from [generator] where [fk model id] = 1
```

As long as [unknown] records are associated the primary key value of 1, above mentioned query will function correctly. However, we must keep in mind that many countries will use consolidation, and that during consolidation records are appended. From this observation, it may happen that primary keys are shifted during append in the destination database, so that the [unknown] records will have a new primary key value.

To compensate for shifting of primary keys, the concept of evaluators has been introduced in RAIS 3.0. Evaluators are tables containing primary key values of special records. The evaluator table [Evaluator Unknown GM] for instance only contains one record, relating the [unknown] record in the table [Generator Model]. Additionally, a relationship between both tables is defined. During consolidation, records that are appended at the destination will have a new primary key inside the destination. The RAIS 3.0 Consolidator has been designed to compensate for this, and update foreign keys referring to that record. In clear words, if records are appended into a new destination database, foreign key values of relating records in other tables are updated to match primary keys of appended records. By means of this, the table [Evaluator Unknown GM] will always contain one value, correctly pointing to the record [unknown] in the table [Generator Model].

Safely retrieving generators with unknown models may then be done by means of below query, explicitly using the evaluator [Evaluator Unknown GM]

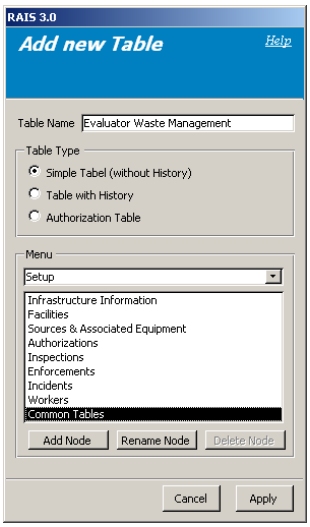
```
Select * from [generator] where [generator].[fk model id] in (select [Evaluator Unknown GM].[fk Generator Model id] from [Evaluator Unknown GM])
```

2.2.1 Examples

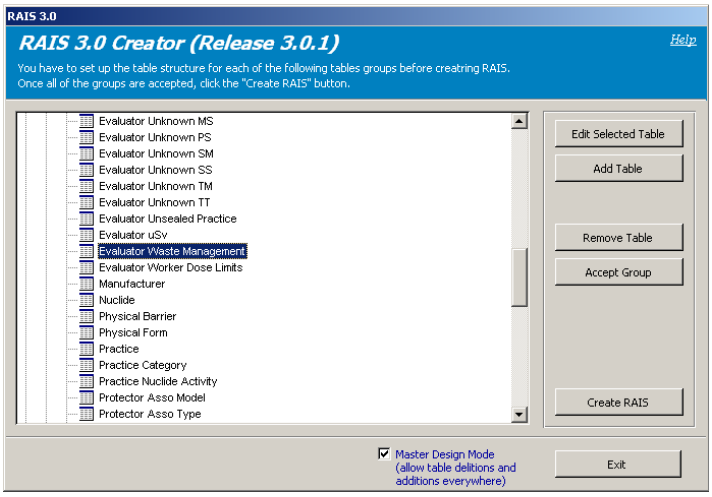
2.2.1.1 Evaluator for waste management facility

The standard installation of RAIS 3.0 does not provide for an evaluator table for waste management facilities. So, in a first step, we have to create this table. If the table has already been created in an earlier step, we may of course skip this section and continue at.

The same hidden functionality of the RAIS Creator is required as for creating new protectors. So, please make again the field [Design Master] visible in the main form of the creator (see section 2.1.1). Next, select and expand the group node ***Common Tables*** and click the button ***Add Table***.

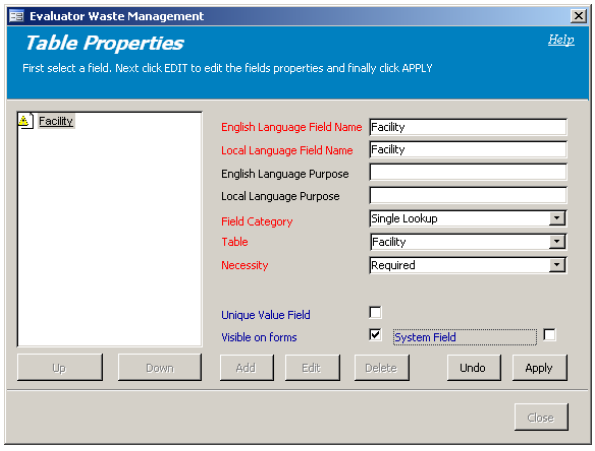


Enter the evaluator table name [*Evaluator Waste Management*], select the option ***Simple Table (without History)***, select the menu ***Setup*** and the menu node ***Common Tables*** and click ***Apply***. The new table will be displayed in the creator form.

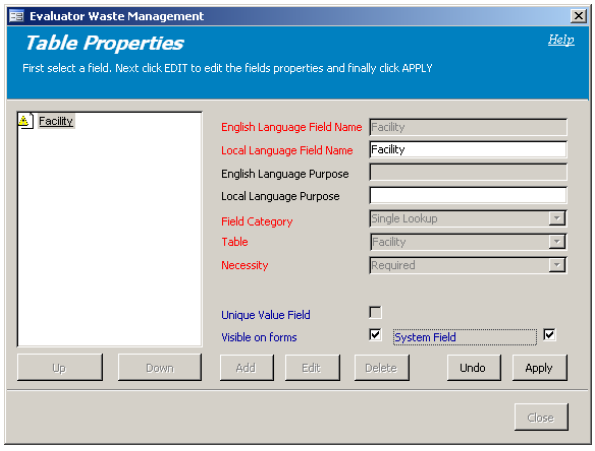


Select the table [***Evaluator Waste Management***], click the button Edit Selected Table and add the following fields.

Create the field Facility. Please enter only field definitions and take care to select the option [System Field] after you have entered all field attributes.



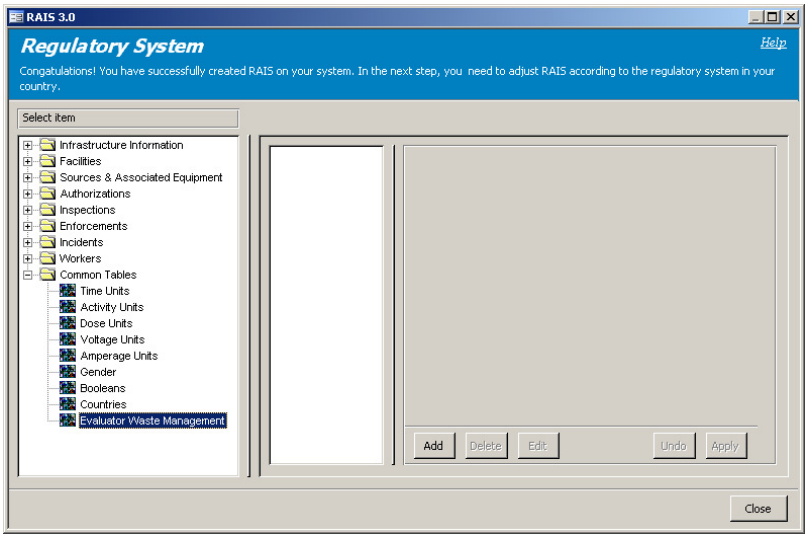
Please note that some fields turn disabled after system field option has been activated.



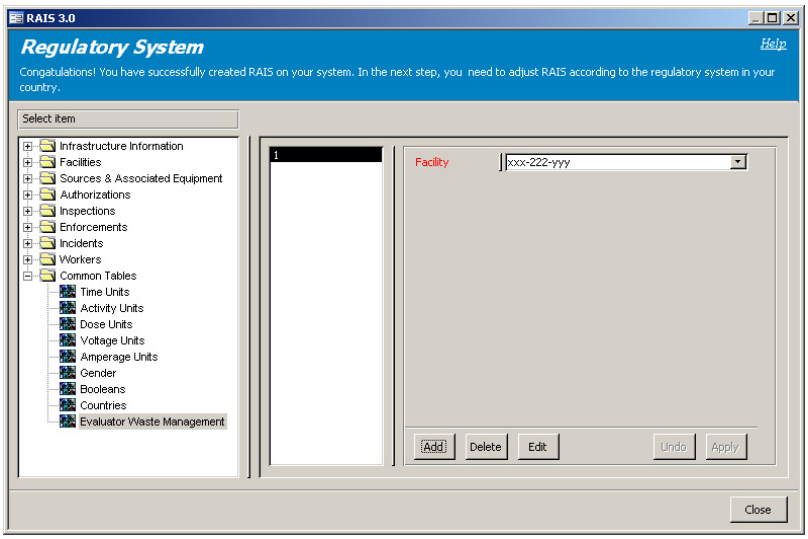
This is to prevent unintended modification of system fields. If you need to correct field attributes, disable the system field option, modify appropriately and enable the system field option again. Click the ***Apply*** button to continue.

Close the table properties form in order to return to the RAIS Creator main form. Accept the table group and create a new RAIS 3.0 front-end **and** back-end. Please take care to create an unlocked front-end.

Open the RAIS 3.0 front-end after creation has been completed. Expand the menu node ***Common Tables*** in the ***Regulatory System*** menu; the new evaluator appears.



It's empty, of course, we only created the table. Next step is to populate our new evaluator. Navigate to the evaluator and click the Add button to create a new evaluating record, just as if you create any other new record in RAIS.



Note:
After the new evaluator record has been created, the left side list box displays by default the primary key value of the facility to be protected. If you want the facility name to be displayed

here, please create a new preselection list query for the form [Evaluator Waste Management] (see section 2.5).

To test that our evaluator is working, please create the following query and execute it.

```
Select * from [Facility] where [Facility].[PK Facility ID] in (select [Evaluator Waste Management].[FK Facility ID] from [Evaluator Waste Management])
```

Now consolidate your backend with any other backend. Open the destination backend and check the record of the waste management facility. Its primary key hopefully does differ from the primary key in the source database, and you will notice that above query still produced the correct result.

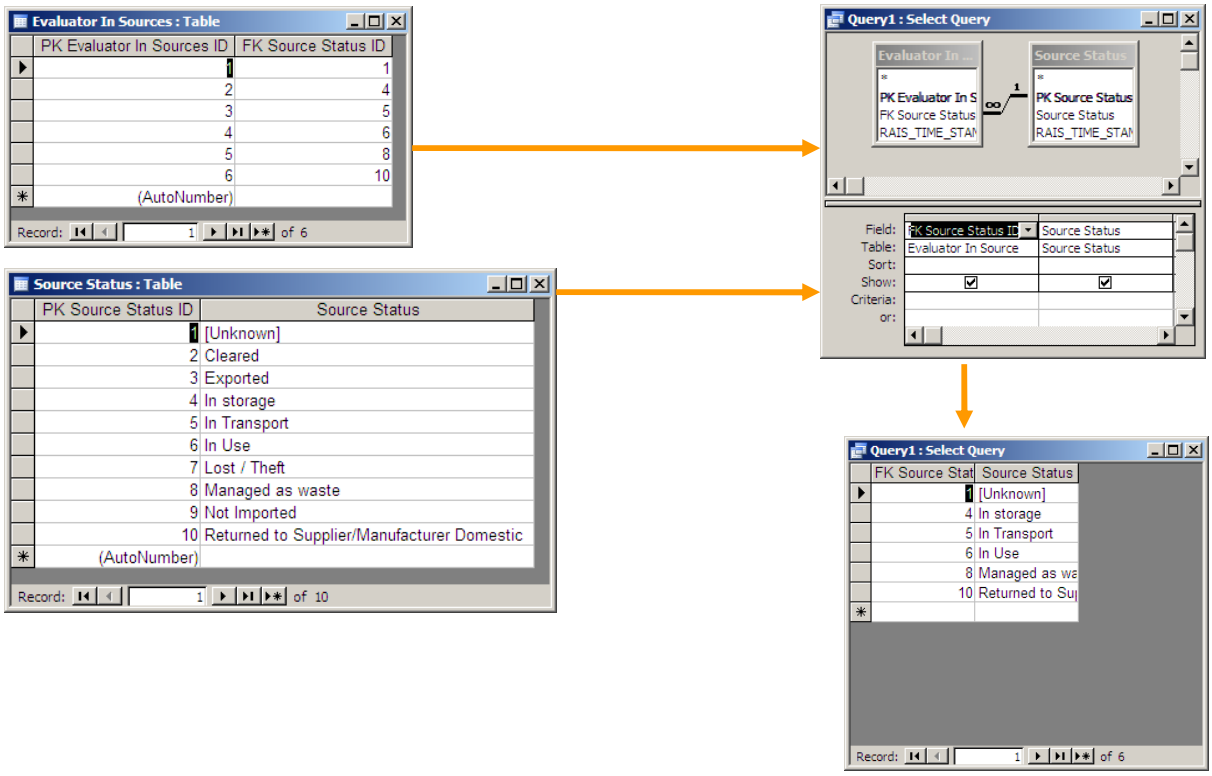
The new evaluator we have been creating appears in the ***Regulatory System*** menu, evaluators defined in the standard version of RAIS 3.0 are not displayed; they are hidden. This hiding feature has been introduced because it might be dangerous to modify, or even delete evaluator records.

After we have defined and validated our new evaluator, we should also protect this evaluator by hiding it from the ***Regulatory System*** menu. Open the table Treeview in the RAIS back-end. Search for the record having the field value [Evaluator Waste Management] in the field [PDI]. Lookup the associated value of the field [Key]; it will usually be something starting with the letter M. This letter makes the menu node for our protector appear under the menu group ***Common Tables***. A hidden menu group exists in RAIS for hiding all evaluators, having the key prefix X. Rename the key of the new protector to something like X99, meanwhile taking care that this key is not yet used.

2.2.2 Comments

We have defined the protector for protecting the waste management facility to be called [Protector Facility]. We did not call the evaluator for the waste management facility [Evaluator Facility], but we gave it name [Evaluator Waste Management]. This evaluator shall not be used for any other purpose than retrieving waste management facilities. If more than one record is appended to this evaluator, we must take care that queries – using this evaluator – do not produce unintended duplicate records.

Another example of an evaluator that contains IDs of sources that are considered to be "in" is shown in the picture below . As it is seen, query and statistics results depend very much on evaluators, therefore, if any query is not producing the desired result (omitting certain type of records, or vise versa, showing irrelevant records), one should turn to evaluators for possible resolution.
As it is seen, query and statistics results depend very much on evaluators, therefore, if any query is not producing the desired result (omitting certain type of records, or vise versa, showing irrelevant records), one should turn to evaluators for possible resolution.



As it is seen, query and statistics results depend very much on evaluators. For example, a query default query shows all sources in the country using the evaluator from the example above, depends on it very much. If a new status for source would be added by user in setup, this query may show incorrect results as new status is not considered by the evaluator. Therefore if any query is not producing the desired result (omitting certain type of records, or vise versa, showing irrelevant records), one should turn to corresponding evaluators for possible resolution.

2.3 Creating Custom Consistency Checks

Consistency checks are fired upon saving records, either after appending a new record or updating a modified record within an input form. Consistency checks are regular SQL statements, returning rows of records. A consistency check is considered non successful if no record row is returned, else the consistency check is considered to be successful. If the consistency check is not successful (evaluates to FALSE) an appropriate message is displayed. This message only is a warning message, users are allowed to skip this message and continue saving the record.

As consistency checks are fired upon saving records, they need to evaluate data users have entered into fields on the input forms before the record is stored. Fields in input forms may easily be evaluated within SQL expression by statements as for example

```
Forms("Input").Controls("ChildForm").Controls("Details").Controls("Serial No")
```

to retrieve the value entered in the field [Serial Number] of a generator or sealed source. To find out the field name of a form field, open the form in design mode and have a look at the property "Name" in the form designer of Microsoft Access. To find the name of the form to

open in design mode, please lookup the table name and open the form called "SUB EDIT table name".

Consistency checks are stored in the table [Propagator – Consistency Checks]

Form Name	Name of the form that will trigger the consistency check
Query Name	Query that will be evaluated
Message	Message to be displayed upon non successful evaluation

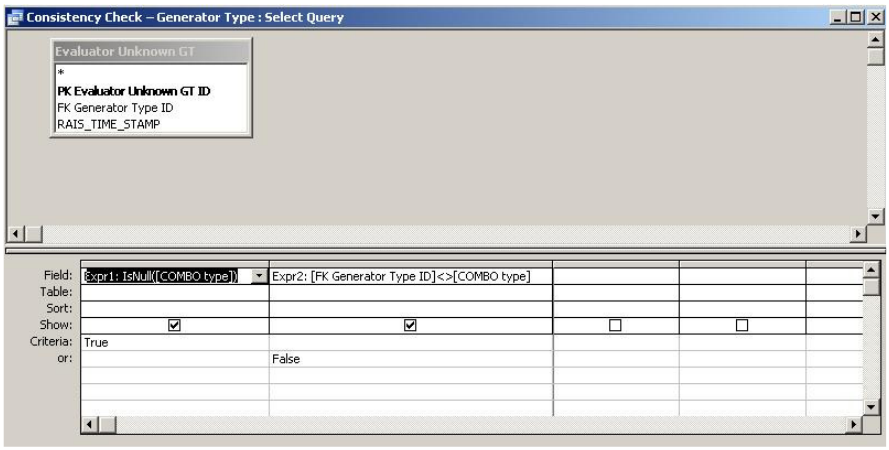
2.3.1 Examples

2.3.1.1 Ensuring selection of a generator type

Let us have the simple example of checking that a generator type has been selected for radiation generators. Generator types have been defined to be optional in RAIS 3.0; the field may be left blank and we may even select the generator type to be unknown.

Have a look at the input form for generators; the field for generator types is a combo box. Open the input form for generators in design mode (that form is called [SUB EDIT Generator] and select the control for generator types. Look at its properties; it is bound to the table field [FK Type ID] and has the name [COMBO Type]. We may refer to that control in queries as if they where constants or table fields, simply with the statement [COMBO Type] (don't forget the square brackets). This is possible due to the fact that consistency checks are executed within the context of the input forms (clever, isn't it).

If we want to enforce RAIS Regulators to enter the generator type, we have to design a consistency check like this one



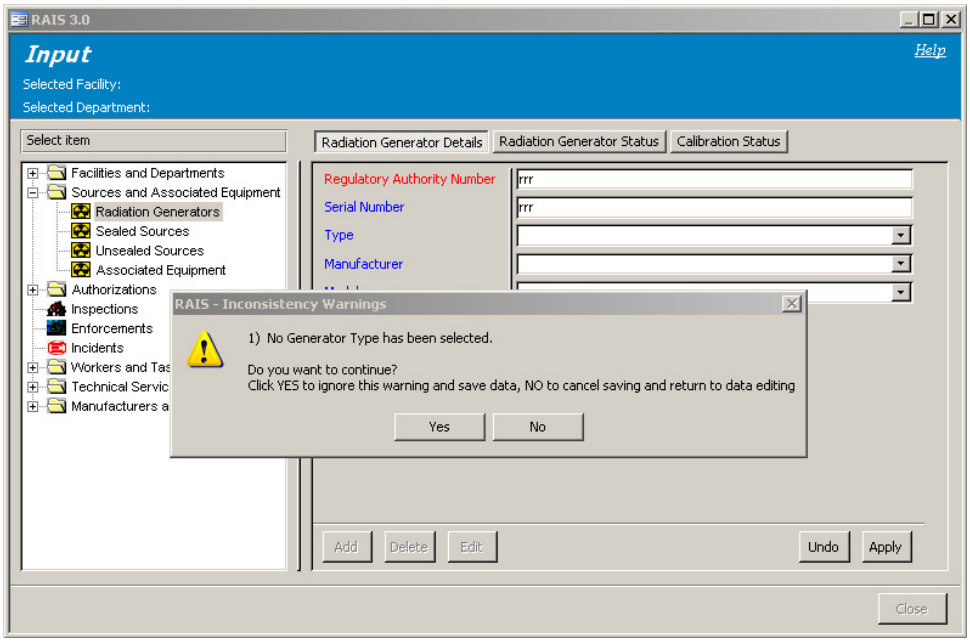
or in SQL view

```
SELECT IsNull([COMBO type]) AS Expr1, [FK Generator Type ID]<>[COMBO type] AS Expr2
FROM [Evaluator Unknown GT]
WHERE (((IsNull([COMBO type]))=True)) OR ((([FK Generator Type ID]<>[COMBO type])=False));
```

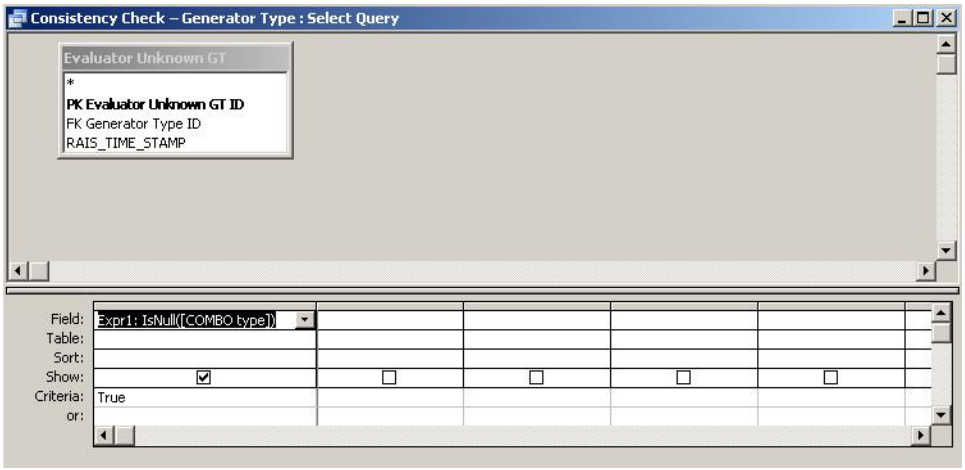
Save this query as [Consistency Check – Generator Type] and append the following record to the table [Propagator – Consistency Checks]

Form Name	SUB EDIT Generator
Query Name	Consistency Check – Generator Type
Message	No Generator Type selected.

Now let's test this: open the RAIS Interface and enter a new generator, without specifying the generator type. You will have about below screen



If you want to allow generator types to be unknown, but want to 'motivate' RAIS Regulators to explicitly specify that the type is unknown by selecting [unknown], modify the query to make it have this shape

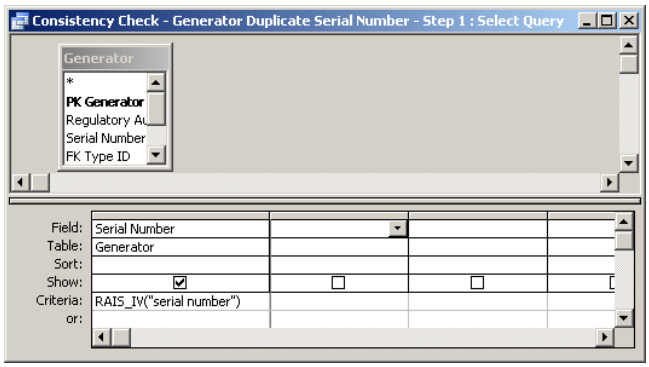


We simply removed the check that the generator type may not equal [unknown]. Microsoft Access requites at least one table for outputting fields, so let's just keep the evaluator; it will not degrade performance and usually has only one record.

2.3.1.2 Duplicate generator serial number

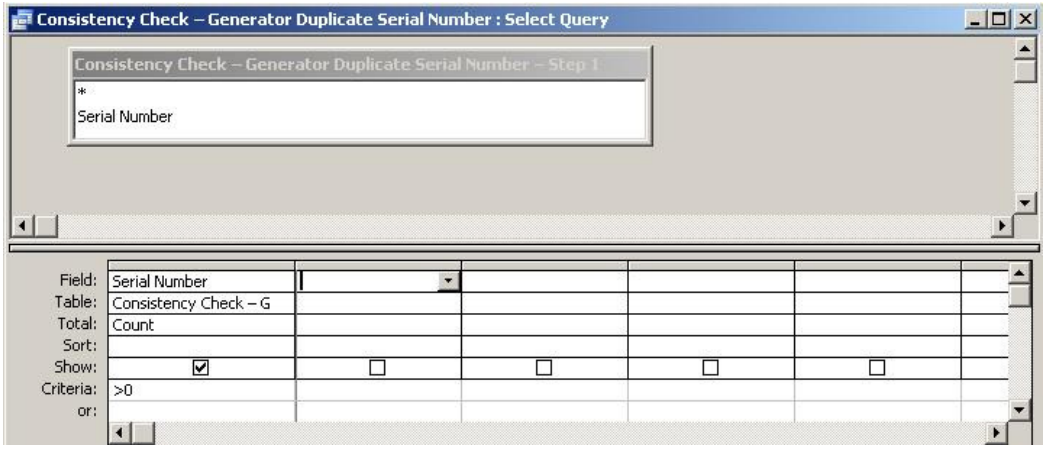
Example 1 was really simple. Let's have a look at something more challenging: implement a consistency check warning about duplicate serial numbers. Serial numbers are optional only within RAIS 3.0. They hence may not be unique, as this would allow for only one generator with unknown serial number to be entered in the whole database. So, as uniqueness is not enforced, it is possible to enter twice the same serial number.

Let's come quickly back to the query in example 1. Its design is simple, but has one disadvantage: we may not test it by simply executing it and looking at its result set. This is due to the fact that we use the field [COMBO Type] directly, which works fine when the query is executed by the RAIS Interface. It does not work when we want to execute the query in parallel to a running RAIS Interface, without saving the record. If we are in the unfortunate situation to face a more complicated consistency check, we definitely want to preview the result set for debugging purpose. In section 2.6, we introduce custom functions to easily access control elements in the RAIS Interface, called Interface Access Functions. We will use those Interface Access Functions in the next consistency check, so be sure that you have implemented those functions as described in that section 2.6. Then, try this query:



Save it as [Consistency Check – Generator Duplicate Serial Number – Step 1]. Open the RAIS Interface and enter a new generator. Run and analyze the query, meanwhile changing the field [Serial Number] (please always assure that you have pressed enter after modifying the field [Serial Number]). After running the query, you will realize that you do not need to save the generator record any more for seeing the query results.

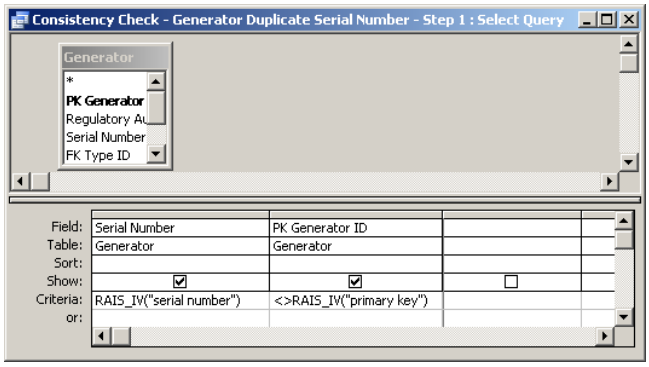
The query checks the table of generators and returns all records that match the serial number we are about to enter for our new generator, i.e. above query returns conflicting records. Remember the definition of consistency checks: they are successful if they return at least one record. So what we want to have in fact is the complement of above query. Create this query:



and again run and analyze it. It returns only a record set if our first step query returns no record set. That's the consistency check we wanted to have. Add the following record to the table [Propagator – Consistency Checks]

Form Name	SUB EDIT Generator
Query Name	Consistency Check – Generator Duplicate Serial Number
Message	Duplicate Serial Number.

There are possibilities to achieve the same with one single query, but we will see immediately the reason why it is recommended to use hierarchical queries. Even with 2 steps, the consistency check is intuitive and simple. Unfortunately, too simple. Go to an existing generator, and switch to EDIT mode. Now, without doing any modifications, click APPLY to save and you will see that the warning message for duplicate serial number appears, although it should not. Our simple query did not take into consideration the fact that if we modify an existing generator the serial number already exists in the table, although it is not duplicate. So we have to exclude the existing record that is about to be modified from the query. This is done most efficiently by excluding via the primary key of the record. Do this in the first step query, make it have the following shape:



and try again. Try adding a new generator and try modifying an existing generator. The consistency check now works correctly for both appending new records and modifying existing records. If you still are not convinced of using hierarchical queries, try to achieve this within a single query. You will need to be very good in SQL, or lots of patience.

2.3.2 Comments

No restrictions apply on how many consistency checks may be attached to one form, one consistency check may even be reused throughout different forms.
To avoid for loss or overwriting of custom consistency checks after RAIS updates, it is highly recommended to use the prefix "CUSTOM - " for all your custom consistency checks names; this prefix is not used by RAIS developers. Section 3.1.3 details how bulk copies of queries with a user define prefix may be easily achieved.
Consistency checks may only evaluate stored records and data modified by the current user; consistency checks are not able to check other users on screen data, possibly being modified at that moment too.
Consistency checks usually take into account unmodified data of the record having just been modified, as that data still is stored in the underlying table. So usually the record being modified has to be excluded from consistency checks by appropriately filtering upon primary key. This applies especially to consistency checks checking for duplicates.
Take care to optimize consistency checks with respect to speed.

2.4 Creating Custom Preselection Values

Propagators are used in RAIS 3.0 for setting preselected values of fields when a new record is about to be created. Use of Preselection values can speed up the performance of users becaue less data is needed to be entered. Propagators are not triggered when an existing record is modified or when modifications are to be saved.

When selecting information items in RAIS 3.0, as for example facilities, we have the possibility to reduce the amount of data visualized by means of pre-selection filters; we may for example select only facilities working within a given region. If we have set this preselection filter, and enter a new facility, the selected region is automatically set. This is done in RAIS by means of propagating preselection values into input forms of information items. RAIS not only is able to propagate preselected values. Any type of value may be propagated, a simple constant as well as the result of a complex Visual Basic function. Propagators also are used to automatically set foreign keys pointing to the correct generator record when entering new generator history records

Propagation of preselected values is defined in the table [Propagator – Preselection], having the following table definition:

Form Name	Name of the form that will use this preselection propagation
Field Name	Field that will receive the value of the propagator
Parameter Name	Name of the control element containing the value to be propagated
Parent	Not used any more

2.4.1 Examples

2.4.1.1 Propagating Preselection Values

Let us start with the example of an existing preselection propagator, above mentioned propagation of the selected region. This is the entry in the table [Propagator – Preselection]

Form Name	SUB EDIT Facility

Field Name	FK Region ID
Parameter Name	Region ID
Parent	Not used any more

This simply makes the value of the control [Region ID] (located in the main input form) be propagated into the field [FK Region ID] of a new facility.

2.4.1.2 Propagating Visual Basic expressions

In this example, we automatically set the current date to be the default date when entering new historical records for workers. Add the following record to the table [Propagator – Preselection]

Form Name	SUB EDIT Person History
Field Name	Status Date
Parameter Name	=Now()
Parent	

Now open the RAIS Interface and add a new worker history. You will notice that the current date is automatically inserted into the status date field. Note that you may overwrite this default value. Also note that you may use any Visual Basic expression that evaluates to a simple type (string or value).

2.4.1.3 Propagating primary keys

RAIS 3.0 has a very extensive concept of history records. Generators have historical records, allowing for tracing the status of generators at any moment in time. When we want to enter a new historical record, we first have to select the generator, switch to its history, and then only we may add a new historical record. It is clear that this new history record must be bound to the generator we have selected, in other words the primary key of the generator must be propagated into the new historical record. This is achieved by the following entry in the table [Propagator – Foreign Keys]

Form Name	SUB EDIT Generator History
Field Name	FK Generator ID
Parameter Name	Parameter 0
Parent	

Please note especially the field [Parameter Name]. The primary key of each information item we select is always copied into the control [Parameter 0] of the main input form. This may be considered as a general identifier. The field Parent is not used any more and should be left blank for compatibility.

2.5 Creating Custom combo box contents

The RAIS Interface contains lots of combo boxes in input forms, offering for example selecting generator models or equipment status. Microsoft Access allows these combo boxes to be filled by results of queries, referred to as entry filters. This feature is used by RAIS through the table [Propagator – Preselection Filters]
Add something on custom list boxes very similar to combo boxes

Form Name	Name of the form that contains the combo box
Field Name	Name of the combo box
Query Name	Name of the query used to fill the combo box
Replacements	Replaces expressions in the original SQL statement. This has been removed in RAIS 3.0 SQL Server Extensions version

Queries used to fill combo boxes always must have the following column layout

Foreign key: the foreign key to be stored in the underlying field of the combo box
Label: the name to be displayed for the foreign key value (shall be unique)

The first field must always be a foreign key, which must comply with the relationship of the combo box's underlying field, i.e. if the underlying field of the combo box is generator model, the relationship of this field clearly points to the table of generator models. The foreign keys returned by the preselection query may only be keys of generator models, not from any other information item. The first column is not displayed in combo boxes, but the value of the first column is stored in the underlying field.

The second field shall be a human readable name, in the above example the generator model's name. It may be a combination from many other fields, it may for example include the amperage and voltage. However you should take care that its value may always clearly be identified, so displaying only amperage values for models to be selected would be a bad idea. Only the second column is displayed in combo boxes, its value however is not stored.

2.5.1 Examples

2.5.1.1 Generator models for generators

Form Name	SUB EDIT Generator
Field Name	COMBO Model
Query Name	Entry Filter – Generator Model
Replacements	

2.5.1.2 Facility and department for generator history

Form Name	SUB EDIT Generator History
Field Name	COMBO Facility
Query Name	Entry Filter – Facility
Replacements	

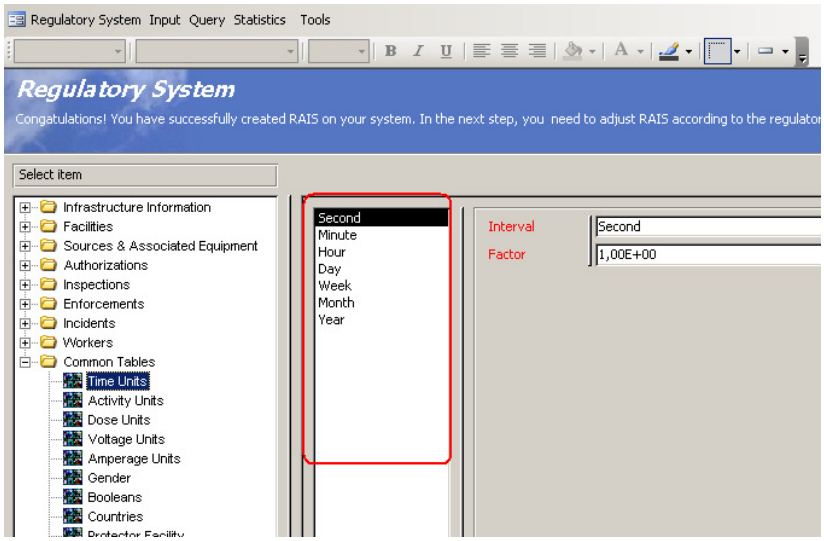
Form Name	SUB EDIT Generator History
Field Name	COMBO Department
Query Name	Entry Filter – Department
Replacements	

2.5.2 Comments

Please take care that each input field shall only have one single query attached.

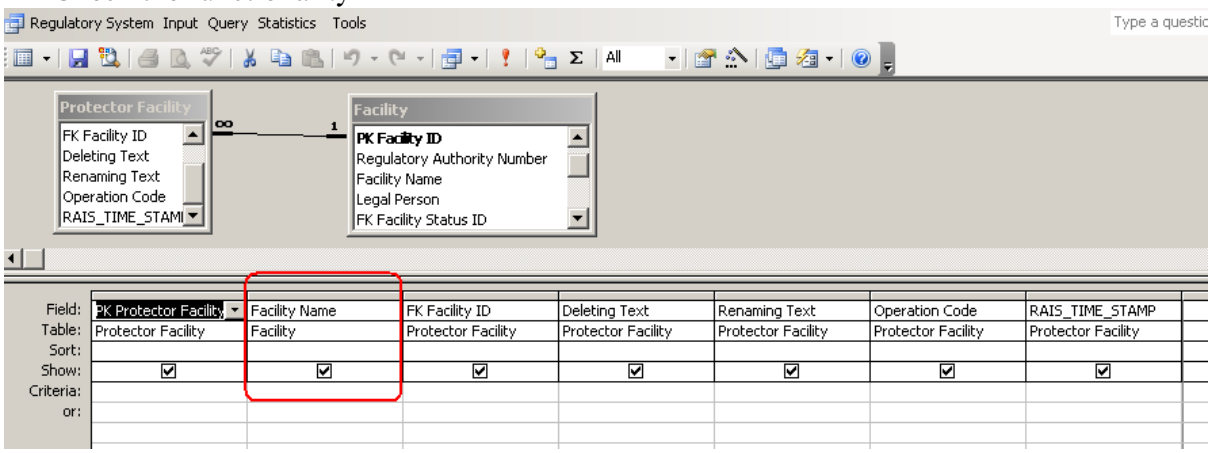
If a combo box field has no query attached, RAIS automatically detects the foreign table this field is bound to and creates a query for displaying the first two fields of that foreign table. Ordering will always be ascending on the second field.
Please note that [Replacements] are not used anymore and should be left blank for compatibility.

2.6 Creating Custom Preselection lists



The picture on the left shows and example of preselection list, it is shown in red box. Creation of preselection lists is a way of changing how information is shown on the display, therefore their function is mainly to ease the work with RAIS to user. One example of a good use of Preselection List is section 2.1, where the list showed only primary key of Facility instead of its Name, whereas the latter would be much easier for user to interpret. To customize this kind of display, one should:

- Open the RAIS Front end in Design Mode
- Create a new query that would contain all information that should be displayed in the preselection window (please note that the actual value that will be displayed should be in column nr.2, column 1 is always reserved for PK (Primary Key) values). An example of such query is shown on the image below
- Open the Frontend in design mode and locate the source for Preselection List (Right-click the area where list is displayed, click properties and locate the source) Remember the name of the source table/query
- Look up the record that contains the above meant source query in table Propogator – Menu selector and substitute the old name of the query with the newly created query
- Check the functionality


Regulatory System Input Query Statistics Tools
Type a questic
Protector Facility
FK Facility ID
Deleting Text
Renaming Text
Operation Code
RAIS_TIME_STAMI
Facility
PK Facility ID
Regulatory Authority Number
Facility Name
Legal Person
FK Facility Status ID
Field: PK Protector Facility | Facility Name | FK Facility ID | Deleting Text | Renaming Text | Operation Code | RAIS_TIME_STAMP
Table: Protector Facility | Facility | Protector Facility | Protector Facility | Protector Facility | Protector Facility | Protector Facility
Sort:
Show:
Criteria:
or:

The red box in the picture above highlights the field that will be shown in the main screen if the corresponding query will be added to the table Propogator – Menu Selector as described before.

2.7 Creating Custom Functions and Modules

RAIS 3.0 allows for adding functions und procedures, according Microsoft Access Visual Basic syntax and requirements. RAIS 3.0 does not impose any limitations or special conventions to be respected; functions, procedures, class modules as well as simple modules may be defined just in the same way as for any other Microsoft Access Application.

The best approach for creating new custom modules is:

- Create and design the new custom module in an unlocked front-end
- Test, debug and validate the new custom module
- Copy the final new custom module in the RAIS 3.0 Creator (hereafter referred to as [source module])

Modify the RAIS 3.0 Creator for the new custom module to be created upon the next creation run:

- Locate the function [Public Sub ModuleCreate] in the module [RAIS Module Creator Functions]
- Include a line DoCmd.CopyObject d, "destination module", acModule, "source module"

Custom functions (and procedures) may be declared in custom modules, just as any function is declared in Microsoft Access. We recommend that all custom functions are declared only in custom modules to avoid for loss or overwrite.

RAIS 3.0 contains a few functions that may be modified by RAIS Administrator and Developers: Regulatory Authority Number (RAN) functions. RAN functions are special in that way that they are automatically invoke upon creation of new records for facilities, departments, sources, inspections, incidents, persons and authorizations. This is done by propagating default values by means of the table [Propagator – Preselection] (see section 2.4)

2.7.1 Examples

2.7.1.1 Regulatory Authority Numbers

Let us redefine the RAN function for new facilities. Have a look at how the default RAN for facilities (and other RAN functions) is defined. Open the RAIS 3.0 front-end in design mode, open the module [RAIS Regulatory Authority Number Functions] and locate the function [BuildFacilityRAN()]

```
Public Function BuildFacilityRAN()
   BuildFacilityRAN = ""
```

```
    Exit Function

    Dim r
    Dim d
    Dim k
    Dim a
    Dim m

    r = DFirst("[System Region]", "[System - State]")
    If r <> "" Then r = "-" & r
    d = DFirst("[System district]", "[System - State]")
    If d <> "" Then d = "-" & d

    Forms.input.Form.[ChildForm].Form.[Details].Controls("Regulatory Authority Number")
= " "
    k = Forms.input.Form.[ChildForm].Form.[Details].Controls("PK Facility ID")

    a = DFirst("[v]", "RAN - Facility")
    If IsNumeric(a) Then
       If a + 1 > k Then k = a + 1
    End If

    k = "-" & k

    BuildFacilityRAN = "FAC" & r & d & k
End Function
```

As we can see, the function simply returns an empty string, i.e. no calculation is executed. Please ignore the rest of RAN functions, this is old code resulting from an abandoned approach. For setting up RAIS 3.0 in a multi-site environment, a first approach was to match sites with both regions and districts. As this approach was not fully compliant with all countries and neither developers nor the IAEA did want to impose the structure of RANs to countries, earlier implementations of RANs have been disabled. Hence, these functions in fact contain no code at all in the original RAIS 3.0 distribution, all RAN functions return empty strings.

Let us however come back to this approach, just for the purpose of an example. Let us assume that RANs for facilities shall contain identifiers of region and districts

When entering new facilities, the RAIS 3.0 Interface expects us to have already selected for a region and a district (if applicable). Both of these values are stored in the variables forms![input]![region id] and forms![input]![district id] respectively. Then our RAN for facilities can be defined like this:

FAC-r-d-n

where *r* is the code of the region, *d* the code of the district and *n* an automatic number of the facility.

Retrieving r is done by looking up the region identifier upon the primary key of the region, thus

```
r= forms![input]![region id]
```

or as an equivalent:

```
r = Forms("Input").Controls("region id")
```

Similar, we may retrieve the district code

```
d=forms![input]![district id]
```

or as an equivalent:

```
r = Forms("Input").Controls("district id")
```

Let us say that retrieving *n* equals retrieving the primary key of the facility that is about to be created. This may than be simply achieved by

```
n= Forms.input.Form.[ChildForm].Form.[Details].Controls("PK Facility ID")
```

with one problem: the primary key is empty, as the record has not yet been created. With MS Access back-ends, there is a simple trick for enforcing the record to be allocated by simply calling this line of code ahead

```
Forms.input.Form.[ChildForm].Form.[Details].Controls("Regulatory Authority
Number")=" "
```

Please note that a blank is quoted at the end of above statement. This is just like typing a blank in the field [Regulatory Authority Number]. This makes MS Access allocate a new record and thus create a primary key, which we may then use. Please note that this does not work on SQL Servers, as they usually generate primary keys only after successful transactions.

By default, the RAN function is disabled by writing

```
  BuildFacilityRAN = ""
  Exit Function
```

So the final code of our facility RAN function will then have this appearance:

```
Public Function BuildFacilityRAN()


  Dim r
  Dim d
  Dim n

  r = Forms("Input").Controls("region id")
  If r <> "" Then r = "-" & r
  d = Forms("Input").Controls("district id")
```

```
    If d <> "" Then d = "-" & d

    Forms("Input").Controls("ChildForm").Controls("Details").Controls("Regulatory
Authority Number") = " "
    n = Forms("Input").Controls("ChildForm").Controls("Details").Controls ("PK Facility ID")
    n = "-" & n

    BuildFacilityRAN = "FAC" & r & d & n
End Function
```

Let us check this function by creating a new facility. As we can see, the computed value is automatically inserted into the field [Regulatory Authority Number] if we go for creating a new facility. This value may be considered to be only a suggested value, i.e. we may replace it.

After we have defined, tested and validated our RAN, we must copy it to the RAIS 3.0 Creator in order to be included on next creation run. This is done most easily by simply copying the module [RAIS Regulatory Authority Number Functions] into the creator.

2.7.1.2 Helper functions

The expression

```
Forms("Input").Controls("ChildForm").Controls("Details").Controls("PK Facility ID")
```

has been used in the previous chapter to retrieve the primary key of a new record. We may retrieve the contents of any field of the input form in a similar manner, even regardless what input form currently is loaded (i.e. facilities, generators, workers etc.) Always writing down this whole expression is annoying and error prone, so let us define a helper function to make developers life more comfortable.

RAIS Input Values

```
Public Function RAIS_IV(a)
    RAIS_IV = Forms("Input").Controls("ChildForm").Controls("Details").Controls(a).Value
End Function
```

You may easily test these functions. Open the RAIS interface and select any facility. Switch to edit mode and keep it there. Now open a new blank module and enter the following code

```
Public Sub test()
    MsgBox RAIS_IV("regulatory authority number")
End Sub
```

Place the cursor at the line containing the statement "Public Sub test" and press F5. You will see a message box popping up and displaying the authority number of that facility. Now switch to the input form of the facility and modify the authority number. Be sure to press enter. Switch back to the module and run again the test function: the modified authority number is displayed.

Another way to test is by means of queries. Create a new query, having the following SQL statement

```
SELECT RAIS_IV("regulatory authority number") AS Expr1;
```

Run this query in datasheet view, and you will see that again the new authority number is displayed. Later sections in this document will make use of especially this functionality.

2.7.2 Comments

When implementing new functions or procedures, we should take care not to introduce naming conflicts. Such conflicts will arise when a function, procedure or variable is defined twice. To avoid duplicates and overwrites, it is highly recommended to use the prefix "CUSTOM_" for all your custom function definitions; this prefix is not used by IAEA RAIS Developers in any code part. In addition, we recommend saving all custom definition in custom code modules. All custom code modules should again have the prefix "CUSTOM – " (RAIS developers will not use this prefix).

Helper functions, as implemented in example 2, shall only be used in early development phases of new queries. Please keep in mind that future development of RAIS will point into the direction of SQL Servers. Helper functions will then degrade performance of execution times of queries, as these helper functions will be executed locally.

Functions and procedures are stored in modules (stand alone modules or form modules) within Microsoft Access. To avoid for loss or overwriting of custom functions and procedures, it is highly recommended to store them in separate stand alone modules.
Note:
Avoid defining global variables, side effects are inherent.
Define local variables as well as sub level functions and procedures to be private.
Avoid using DLL functions directly by using Declare statements, CreateObject is to be preferred for compatibility to future releases of Microsoft Office.

2.8 Creating Custom Forms

The best approach for creating new custom forms is:

- Create and design the new custom form in an unlocked front-end
- Test, debug and validate the new custom form
- Copy the final new custom form in the RAIS 3.0 Creator (hereafter referred to as [source form])

The next step is to make your new custom form accessible via the treeview menu

- Create the record entries to bind the new form to a new menu point (see section 2.10)

Modify the RAIS 3.0 Creator for the new custom form to be created upon the next creation run. See section 3.2 for details

Custom forms, as well as standard RAIS forms, allow for public access of all of their control elements as well as public variables and functions or procedures. The general syntax for accessing control elements is:

forms![*form name*].controls[*control name*]

This is used for example when accessing filtering parameters for queries

To avoid for loss or overwriting of custom forms after RAIS updates, it is highly recommended to use the prefix "CUSTOM_" for all custom form names; this prefix is not used by RAIS developers.

2.8.1 Example

In general, creating forms is facilitated by the creator by means of creating a table (creator will automatically create the form for new table) and should be avoided otherwise. However, it is mentioned here to complete the description of creating objects in RAIS 3.0.
Custom Forms can be created same way as normally in MS Access, however to be able so use them, one should take care to make the form appear by entering appropriate information to the treeview table (section 2.10), and making sure that the form will be created on the next creator run (section 3.2).

Note:
Follow the guidelines for creating custom functions and modules (see section 2.6)

2.9 Creating Custom Tables

In general, creating custom tables is facilitated by the creator and should be avoided otherwise. However, it is mentioned here just to complete the description of creating objects in RAIS 3.0.

Custom tables may be useful to store information which is not directly related to the management scope of RAIS, as for example law texts or ISO codes; these tables may be created just as any other table in Microsoft Access. These tables should however only be used by custom functions in RAIS, they should not be related to any standard RAIS table; data integrity problems may occur. Custom forms (see section 2.8) shall manage updates and deletions as well as data visualization.

After custom tables have been created and tested in the RAIS Front-End, you need to modify the RAIS 3.0 Creator for the new custom table to be created upon the next creation run. The creator has to be modified in order to create both the new table in the back-end and a table link in the front-end.

2.9.1 Comments

Do not manually create any relations between custom tables and RAIS tables

Manual creation of RAIS tables shall be avoided as the RAIS 3.0 Creator is fully covering this task. Only creation of static tables – tables where no fields are added by the creator – was discussed in this section.
To avoid loss or overwriting of static tables after RAIS updates, it is highly recommended to use the prefix "CUSTOM -" for all static table names; this prefix is not used by RAIS developers. When creating new tables through the interface of the RAIS Creator, the prefix "CUSTOM – " shall of course be avoided

2.10 Creating Custom Menu entries

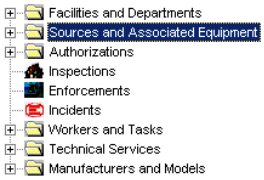
Separate this section between general considerations and examples (2.9.1) by just copy and paste the following
RAIS 3.0 provides for two major types of menus:

- Treeview menus
- Standard menus

2.10.1 Examples

2.10.1.1 Creating Treeview Menus

Treeview menus are menus displayed at the left side of the forms ***Regulatory System***, ***Input***, ***Queries*** and ***Satistics***.



Entries for the treeview menu are stored in the table [Treeview], having the following table definition:

PDI ID	Primary key, auto-number field (please do not modify)
PDI	Menu text to be displayed
Key	Key for menu ordering, a single letter followed by two digits. Letters A, D, X,Y and Z are reserved
Image Index	Index of image to be used
Menu Name	Menu group, may be either setup, input, query or statistic

RAIS provides for several images indexed from 1 to 9.
Note:
Letter A is reserved for facilities and departments. Special RAIS functions are called automatically when users navigate inside menus whose keys start with the letter A.
Letter D is reserved for authorizations. Again, special RAIS functions are called automatically when users navigate inside menus whose keys start with the letter D.
Letter X and Y are reserved for evaluators and protectors respectively. Menus starting with these letters are hidden, only if they belong to the setup menu group.

Letter Z is reserved for future RAIS development.

Example:

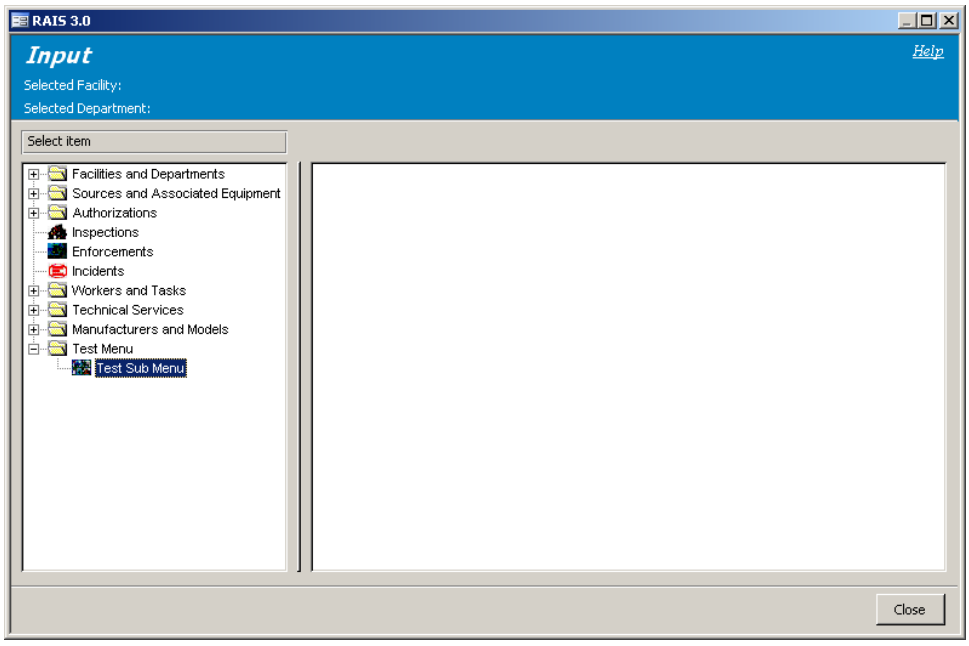
Open the table Treview and create a new record with the following field values

PDI ID	N/A
PDI	Test Menu
Key	P
Image Index	1
Menu Name	Input

Next create a new record with these field values

PDI ID	N/A
PDI	Test Sub Menu
Key	P01
Image Index	2
Menu Name	Input

Result



The new menu now appears in our treeview. If we click on it, nothing happens, a blank screen is displayed because the form to be displayed has not been assigned yet. To do so open the table called [Propagator – Menu Selector], having the following table definition.

Menu Form	Menu group, may be either *setup*, *input*, *query* or *statistics*
Menu Name	Key, referring a record in the table [Treeview]
Tab Position	The tab number, zero based
Tab Name	Tab text to be displayed, may be empty
Type	Menu type (see below)

Label 5	Text for label 5
Query 5	Query for filling combo box 5
Label 4	Text for label 4
Query 4	Query for filling combo box 4
Label 3	Text for label 3
Query 3	Query for filling combo box 3
Label 2	Text for label 2
Query 2	Query for filling combo box 2
Label 1	Text for label 1
Query 1	Query for filling combo box 1
Label 0	Currently unused
Query 0	Query for filling list box 0
Form	Name of the form to be loaded when this menu point (or tab) becomes active
Image Index	Number of image to be used in the treeview

The field [Type] indicates the type of form to be used.

0 for a preselection form
1 for a selection list with record details (see manufacturers for example)
2 for a combo box with record details (currently not used)
3 for a details form (see input of generators, generator history and calibration for example)
4 for query and statistics parameter form
5-999 reserved for future use
1000 for custom use

Create a custom form (see section 2.8) called [Custom – Hello World] and add a simple label to it "Hello World". Then open the table [Propagator – Menu Selector] and enter a new record having the following field values:

Menu Form	Input
Menu Name	P01
Tab Position	0
Tab Name	
Type	1000
Label 5	
Query 5	
Label 4	
Query 4	
Label 3	
Query 3	
Label 2	
Query 2	
Label 1	
Query 1	
Label 0	
Query 0	
Form	Custom – Hello World

Image Index	

If this is the first menu entry for use with custom forms, the RAIS Creator must be enhanced to cope with custom forms. Locate the function ShowTab(n As Long) in the module section of the form [Input]. Locate the last select statement in that function and replace the code section

```
    Case 5:
      SecureSetSubForm [ChildForm], "Selection Help"
End Select
```

by this code section

```
    Case 5:
      SecureSetSubForm [ChildForm], "Selection Help"

    Case 1000:
      SecureSetSubForm [ChildForm], [tab settings].column(17, n)
End Select
```

Locate the VB statement directly after End Select. It looks like:

```
if [ChildForm].SourceObject <> "" Then
```

Replace it by the following statement:

```
if [ChildForm].SourceObject <> "" And [Tab Settings].column(4,n) <> 1000 Then
```

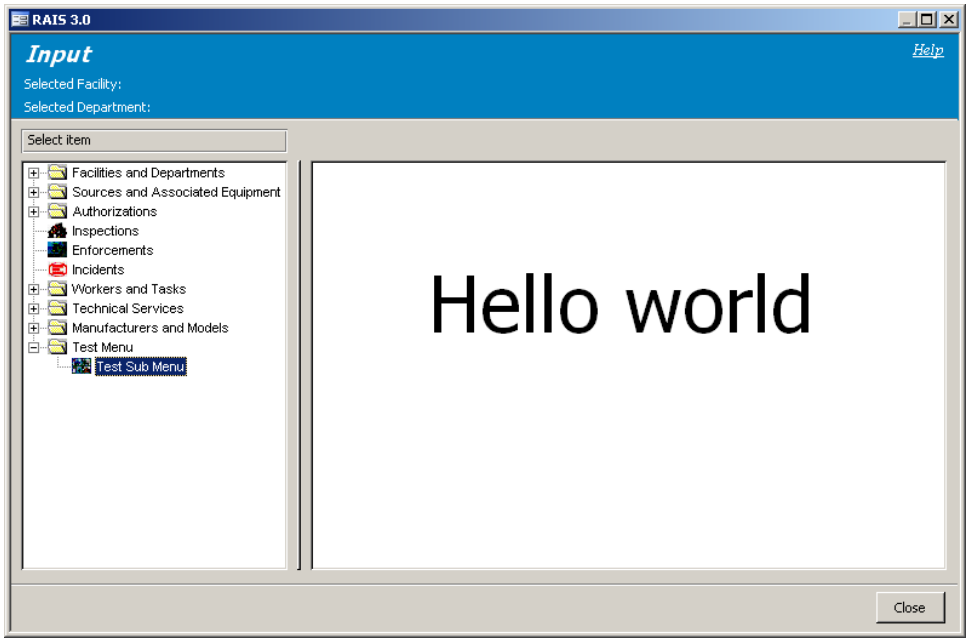
Locate the function Form_Unload(Cancel as integer). The first line looks like:

```
if [ChildForm].SourceObject <> "" Then
```

Replace it by

```
if [ChildForm].SourceObject <> ""And [Tab Settings].column(4,0) <> 1000 Then
```

Result



After the new menu has been validated, records that have been added to both the [Propagator – Menu Selector] and [Treeview] tables need be copied to the RAIS 3.0 Creator. The new form created [Custom – Hello World] also needs to be copied to the Creator (see section 3.2 for more details).

Notes:
Do not modify any of the menu entries created by the RAIS Creator. No data in the RAIS back-end will be destroyed, but entering new data may become impossible.

2.10.1.2 Creating Standard Menus

Standard menus are menus displayed at the very top of the RAIS main window; they are standard MS Windows menus. Menu points may either be located in the menu bar or in a drop down.

Creating standard menus is not as tricky as creating treeview menus. The usual practice for creating new objects is to create them first in the front-end and then copy them into the creator. For standard menus, the best practice is doing all modifications directly in the RAIS Creator.

Let's create a new menu Custom Menu, with a sub menu called "Hello World" used to open the custom form "Custom – Hello World". Refer to section 2.7 for creating custom forms. Open the RAIS Creator in design mode, and locate the function MenuCreate() in the module [RAIS Menu Creator Functions]. Replace the code section

```
Set v = AddPopupMenu(m, "Tools")
AddExecutableMenu v, "Search Tool", "Search"
```

```
AddExecutableMenu v, "Calculations", "Calculations"
AddExecutableMenu v, "Local Settings", "Options"
AddExecutableMenu v, "Backend Connection", "Connection"
AddExecutableMenu v, "About RAIS 3.0", "About"
Set v = Nothing
```

by this code section

```
Set v = AddPopupMenu(m, "Tools")
AddExecutableMenu v, "Search Tool", "Search"
AddExecutableMenu v, "Calculations", "Calculations"
AddExecutableMenu v, "Local Settings", "Options"
AddExecutableMenu v, "Backend Connection", "Connection"
AddExecutableMenu v, "About RAIS 3.0", "About"

Set v = AddPopupMenu(m, "Custom Menu")
AddExecutableMenu v, "Custom – Hello World", "Custom – Hello World"

Set v = Nothing
```

Next locate the function Menu_Loader() in the module [RAIS Loader]. Replace the code section

```
ElseIf s = "About" Then
   DoCmd.OpenForm "About", , , , , acDialog
Else
```

by this code section

```
ElseIf s = "About" Then
   DoCmd.OpenForm "About", , , , , acDialog

ElseIf s = "Custom – Hello World" Then
   DoCmd.OpenForm "Custom – Hello World", , , , , acDialog

Else
```

The new standard menu we have created in the previous section is accessible to everyone, because no permissions have been defined. Let us assume this menu point shall only be accessible to RAIS Regulators. RAIS Administrators Users and Guest shall not be allowed to activate this menu point and thus load the custom form. Open the RAIS Creator in design mode and locate the function EnableMenusToGroups(b As Boolean) in the module [RAIS Settings]. Replace the code sections

```
CommandBars("RAIS Menu Bar").Controls(1).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(2).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(3).Enabled = Not b
```

```
CommandBars("RAIS Menu Bar").Controls(5).Controls(1).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(5).Controls(2).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(5).Controls(3).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(5).Controls(4).Enabled = Not b
```

```
If BelongsToGroup(CurrentUser, "RAIS Regulators") Then
   CommandBars("RAIS Menu Bar").Controls(3).Enabled = b
   CommandBars("RAIS Menu Bar").Controls(2).Enabled = b

   CommandBars("RAIS Menu Bar").Controls(5).Controls(1).Enabled = b
   CommandBars("RAIS Menu Bar").Controls(5).Controls(2).Enabled = b
   CommandBars("RAIS Menu Bar").Controls(5).Controls(3).Enabled = b
End If
```

by these sections

```
CommandBars("RAIS Menu Bar").Controls(1).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(2).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(3).Enabled = Not b

CommandBars("RAIS Menu Bar").Controls(6).Enabled = Not b

CommandBars("RAIS Menu Bar").Controls(5).Controls(1).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(5).Controls(2).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(5).Controls(3).Enabled = Not b
CommandBars("RAIS Menu Bar").Controls(5).Controls(4).Enabled = Not b
```

```
If BelongsToGroup(CurrentUser, "RAIS Regulators") Then

   CommandBars("RAIS Menu Bar").Controls(6).Enabled = b

   CommandBars("RAIS Menu Bar").Controls(3).Enabled = b
   CommandBars("RAIS Menu Bar").Controls(2).Enabled = b

   CommandBars("RAIS Menu Bar").Controls(5).Controls(1).Enabled = b
   CommandBars("RAIS Menu Bar").Controls(5).Controls(2).Enabled = b
   CommandBars("RAIS Menu Bar").Controls(5).Controls(3).Enabled = b
End If
```

2.10.2 Comments

If forms are opened with the parameter acDialog, they may not loose focus. You may remove this parameter if you want to allow custom forms to be opened and user switching to the RAIS Interface forms or other custom forms.

2.11 Creating Custom Queries and Statistics

The process of creating custom queries or statistics is among the complicate tasks of advanced customizations of RAIS. Let us briefly outline steps to be executed, before coming to some examples.

- Define the query, using static parameters only, meanwhile identifying all required parameters for later use,
- Test and validate the query,
- Add a new record to the table "Treeview" in order for query to appear in the interface
- Link query parameters to the Query Parameter Form by entering new record to the table Propogator – Menu Selector
- Create report definition entry as well as parameters for record grouping in the table Propogator – Report Definitions
- Test and validate how the query works through the interface
- Copy customizations into the creator

It is clear that all queries and statistics need testing and validation. We recommend this as often as possible, especially when we are handling highly complex queries.

Queries and statistics within RAIS 3.0 are to be designed just as queries in any other Microsoft Access Application. However, queries most often will require some filtering to be applied on parameters. These parameters are retrieved from a special form, designed for this purpose, called [Query Parameter form]. This form offers a total of 7 parameters:

(tables already described in section 2.9)

List 5	Combo box that may be populated by underlying record sets. Each of these combo boxes may again be used as a parameter for other combo boxes underlying record sets. Combo boxes only are visible if an underlying table is defined in the table [Propagator – Report Definitions]
List 4	
List 3	
List 2	
List 1	
List 0	
Start Date / End Date	Start and end dates that define the time period for the query. Note that these shall be converted using the function CVDate() to avoid for date conversion problems. Date fields only are visible if the value of the field [Query 0] of the relevant record in the table [Propagator – Menu Selector] has three leading dashes "---".

Each of these parameters may easily be used in SQL statements, such as in the example below:

```
Select * from [generators history] where (
([fk generator type id] = forms![query parameter form]![list 5])
and
([status date] between
CVDate(forms![query parameter form]![start date])
and
CVDate(forms![query parameter form]![end date])));
```

When designing queries, we recommend using only static filtering in a first step. Note that RAIS 3.0 currently allows only for foreign keys and date values to be used as parameter values, i.e. numeric values and date values.

To create the report definition entry as well as parameters for record grouping, open and add a new record in the table [Propagator – Report definitions].

Menu Item	Identifier of the menu item
Query	Name of the query to be loaded to retrieve the result set
Title	Title to be displayed
Grouping	Field grouping, semi colon separated list (i.e. 3;4;2)
Widths	Field widths, semi colon separated list (i.e. 3;4;2) currently not supported

2.11.1 Examples

2.11.1.1 Query unsealed sources to associated equipment

Let us have a look at how the query for displaying the history of unsealed sources to associated equipment was created in RAIS 3.0. The appropriate query already exists and has been validated, so we may skip the first two steps and immediately jump to creating the menu entry.

Our entry, called "History of unsealed Sources to associated Equipment", is located in the menu group node called "History". Two entries hence are required in the table [Treeview]: one entry – with the key *L* – for the menu group node (not linked to a query parameter form)

PDI ID	N/A
PDI	History
Key	L
Image Index	1
Menu Name	Query

and one entry – with the key *L13* –for the menu leave (linked to a query parameter form).

PDI ID	N/A
PDI	History of unsealed Sources to associated Equipment
Key	L13
Image Index	2
Menu Name	Query

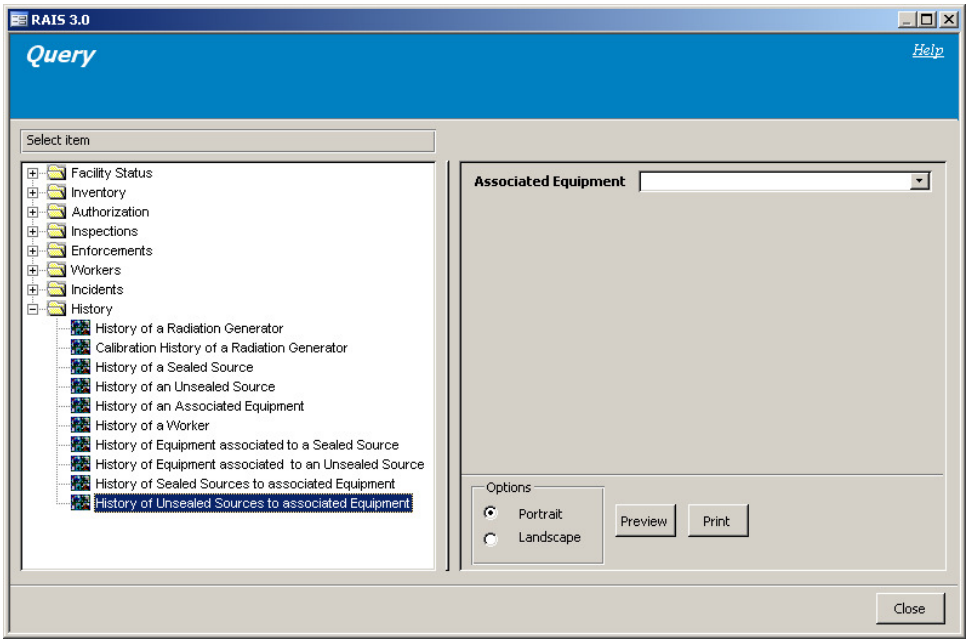
As only the second menu entry is linked to the query parameter form, only one entry – with the key *L13* – is required in the table [Propagator – Menu selector] for defining query parameters

Menu Form	Query
Menu Name	L13
Tab Position	0
Tab Name	L10 (not used)
Type	4
Label 5	Associated Equipment
Query 5	Preselection Filter – Asso All
Label 4	
Query 4	
Label 3	
Query 3	
Label 2	
Query 2	
Label 1	
Query 1	
Label 0	
Query 0	
Form	Query Parameter Form
Image Index	1

One entry only again is required for defining style and layout of the report to be printed. This entry again refers to the menu item L13 in the table [Propagator – Report Definitions]

Menu Item	L13
Query	Query - History | Asso Unsealed
Title	Asso Unsealed History
Grouping	0
Widths	0

We may check the result by simply opening the RAIS Front-End, navigating to History in the ***Query*** menu.



2.11.1.2 Statistic for practice profile

Let us now have a look at how the statistical query for displaying the practice profile has been inserted into the RAIS 3.0 interface. The menu entry will not be located in a menu group node, so only one entry is required in the table [Treeview] – with the key *P* – for the menu leave (linked to a query parameter form).

PDI ID	N/A
PDI	Practice Profile
Key	P
Image Index	1
Menu Name	Statistics

Only one entry – with the key *P* – is required in the table [Propagator – Menu selector]

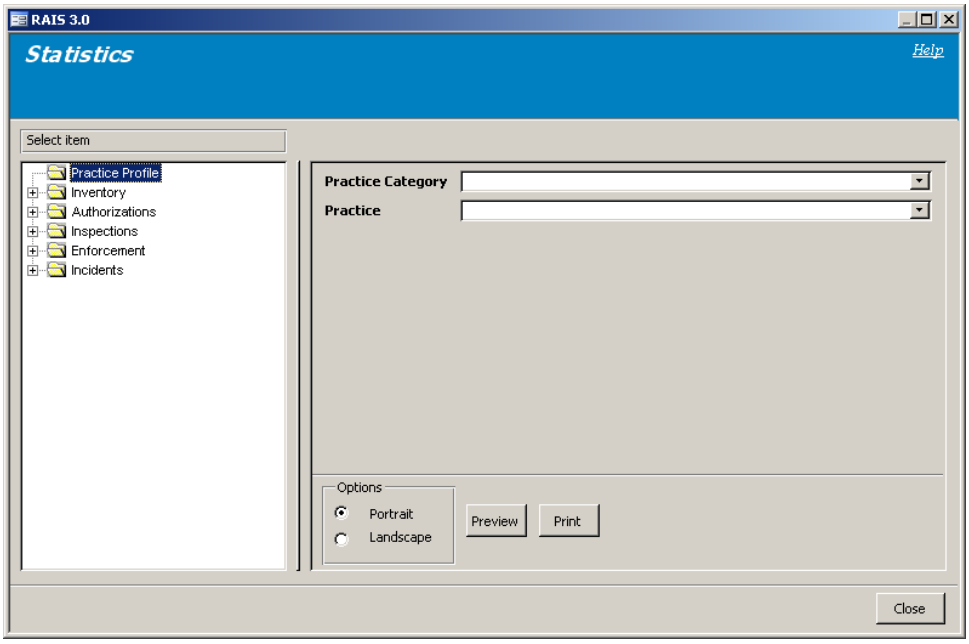
Menu Form	Statistics
Menu Name	P
Tab Position	0
Tab Name	P
Type	4
Label 5	Practice Category
Query 5	Practice Category
Label 4	Practice
Query 4	Preselection Filter - Practice by Category
Label 3	
Query 3	
Label 2	
Query 2	
Label 1	
Query 1	
Label 0	

Query 0	
Form	Query Parameter Form
Image Index	0

And again only one entry in the table [Propagator – Report Definitions]

Menu Item	P
Query	Statistics - Practice Profile
Title	Practice Profile
Grouping	0
Widths	0

We may check the result by simply opening the RAIS Front-End, navigating to Practice Profile in the ***Statistics*** menu.



2.11.2 Comments

To avoid for loss or overwriting of custom statistics after RAIS updates, it is highly recommended to use the prefix "CUSTOM - " for all your custom statistic query names; this prefix is not used by RAIS developers. Section 3.1.3 details how bulk copies of queries with a user defined prefix may be easily achieved.

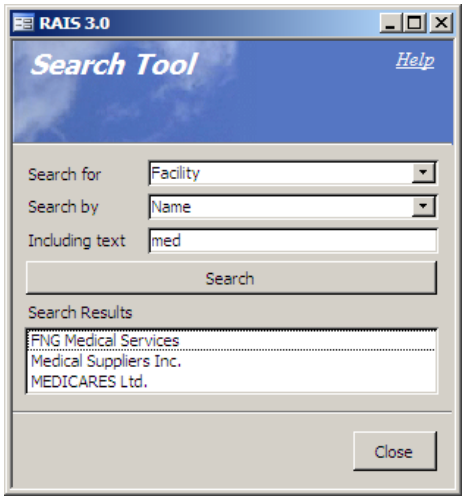
Note
Always take care at NULL values when designing custom queries
To create menu entries for your custom queries and statistics, please refer to section 2.9.
Keys starting with the letters A, D, X, Y and Z are reserved for RAIS use.

RAIS 3.0 Administrators can also design a custom report using standard MS Access functionalities. In such a case, a menu entry has to be created to select this custom report from the treeview. Such custom report shall be based on a custom query.

After copying the new report from the front end to the creator, modification of the creator is necessary for the new report to be created upon the next creation run See section 3.2 for details.

2.12 Customizing Search Functionality

The search form allows for searching of information items as for instance facilities, sources and workers. Information items may be searched by parts of the regulatory authority number or their names. SQL statements are used to display search results in the result window of the search form. Double-clicking on any entries of the result list then allows switching to the selected record.



Search filters are defined by records in the table [System - Search]

Search Item	Name of the item to search for (need not match any table name)
Search Field	Name of the data field to be searched for (need not match any field name). The value of this field is to be used in filter statements with the expression [NAME]
Search SQL	SQL string filtering for search results matching the search field value.
Result Menu	Menu to load on double-click
Result Form	Data entry form to load on double-click

Example:

This example shows definitions required for a search filter allowing for searching a facility by name:

Search Item	Facility
Search Filed	Name
Search SQL	select [PK Facility ID], [Facility Name] from [Facility] where [Facility Name] like "*" & [Value] & "*" order by [Facility Name]
Result Menu	INPUT
Result Form	SUB EDIT Facility

Please note that SQL statements shall always return search result in the form *Primary Key, Name*. Also note that the field Search SQL may contain either an SQL statement or a named query.

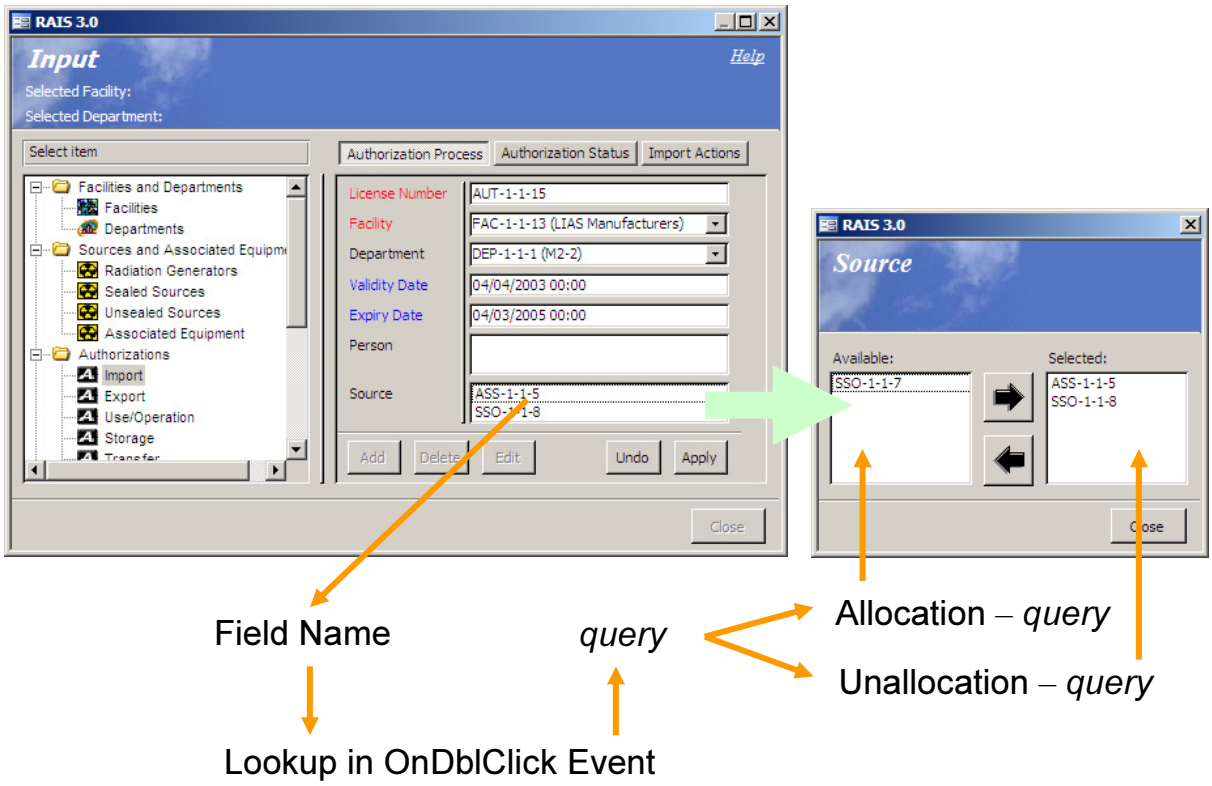
Search Item	Facility
Search Filed	Name
Search SQL	Facility Name Search List
Result Menu	INPUT
Result Form	SUB EDIT Facility

where the query named [Facility Name Search List] would contain the statement

select [PK Facility ID], [Facility Name] from [Facility] where [Facility Name] like "" & [Value] & "*" order by [Facility Name]*

2.13 Multiple selection (junction forms)

The lists on the junction forms are fed by "Unallocation" and "Allocation" queries for the left hand side and right hand side list respectively (see the picture below). Those queries and forms are easily created with the Creator (selecting "Multiple lookup" field when creating new field on a form).



The general approach for customization applies also to multiple selection form queries:
The best approach for creating new custom forms is:

- Design the needed customization in an unlocked front-end
- Test, debug and validate the new customization
- Copy the final new custom form in the RAIS 3.0 Creator

Note:
When modifying the way how multiple selection form appears, one should be aware that all modifications should be done both in Unallocation and Allocation forms. Also, please consider that junction functions are very complex by nature; one should not usually modify them.

3 Copying customizations from a front-end to the creator

3.1 Copying Queries

Queries are most easily copied by a simple Drag-and-Drop operation from the Front-End into the Creator. If the query to be copied already exists in the Creator, MS Access will ask for a new name. This may easily be avoided by first deleting the query to be copied from the creator, as a new query from the Front-End is going to supersede that very query. Please note that both Front-End and Creator need to be opened in design mode in order to execute Drag-and-Drop operations.

Queries to be copied from the Front-End usually contain both tables and relations. When copying queries by Drag and Drop operations into the Creator, these relationships generally are broken if the query is run, due to the fact that the Creator does not "know" about those relationships. The results of this unfortunate behavior are non-working queries.

To avoid for this, we recommend linking the RAIS Creator to a RAIS backend, possibly a test backend only. This is easily achieved by opening the form [Backend Selector] manually within the Creator and selecting a RAIS Backend to "connect to" just the same way as within the RAIS User Interface.

Above mentioned procedure allows MS Access to preserve relationships within SQL Statements during Copy/Paste operations.

Another possibility is to open the query to be copied in SQL view, copy the text of the SQL statement and paste it in a new blank query opened in the creator in SQL view. Save this new query in the creator with the same name as the one in the front end.

3.1.1 Simple static SQL Statements

The RAIS creator uses bulk copies to copy all SQL statement having a specific prefix into the created Frontend. Below is a list of SQL Statement prefixes that are copied during creation.

Prefix
[Consistency Check -]
[Preselection Filter -]
[Preselection List -]
[Entry Filter -]
[Allocation Filter -]
[Report Queries]
[Helper -]
[Display -]
[Mini Display -]
[Item Selection -]
[Query -]
[Statistics -]

[RAN -]
[Calculation -]
[Export Selection -]
[Exportable Selection -]
[Exported Selection -]
[Exported Overall Selection -]
[Import Selection -]
[Importable Selection -]
[Imported Selection -]
[Imported Overall Selection -]
[Menu Selection –]

3.1.2 Complex, multiple selection managing queries

Allocation and un-allocation queries are required for managing multiple selection fields. These SQL statements are generated only during the creation process of the RAIS User Interface. Only simple default definition of allocation and un-allocation queries are generated, which might not necessarily always fit the demands. Hence, developers have been granted the possibility to overload automatically generated allocation and un-allocation queries by predefining them inside the RAIS Creator. The RAIS Creator will generate only those allocation and un-allocation queries that have not yet been defined inside the creator. If queries already exist, the Creator will simply copy them into the Front-End.

Prefix
[Allocation -]
[UnAllocation -]

3.1.3 Completing the integration of the new queries in RAIS

In order for the new queries that have a prefix different from the two lists above (for example "CUSTOM - ") to be created upon next run of the creator, it is necessary to modify the creator source code as described below:

- Open RAIS 3.0 Creator in design mode
- Locate the function [Public Function CreateQueries] in the module [RAIS Database Creator Functions]
- Include a line `CreateQueriesRange db, "CUSTOM - "`

3.2 Copying forms and reports

Forms are most easily copied by a simple Drag-and-Drop operation from the Front-End into the Creator. If the form to be copied already exists in the Creator, MS Access will ask for a

new name. This may easily be avoided by first deleting the form to be copied from the creator, as a new form from the Front-End is going to supersede that very form.

Please note that both Front-End and Creator need be opened in design mode in order to execute Drag-and-Drop operations. Please note that the RAIS Creator often uses form templates. These form templates have different names in both the Front-End and the Creator, hence manual renaming is required for templates.

Below is a matching table for form template names to forms, Front-End forms are copied during creation. Modifying these forms modifies the general behavior of all selection forms or treeview forms respectively.

Front-End Form Name	Creator Form Template Name
Preselection	Template Preselection Form
Query Parameter Form	Template Query Parameter Form
Selection Help	Template Selection Help Form
Selection List	Template Selection List Form
Selection Print	Template Selection Print Form
Selection Tab	Template Selection Tab Form
Input	Template Treeview Form
Sub Edit [table name]	Template Sub View Form
[table name] [table name] (multiple select forms)	Template Junction Form

Below is a list of forms copied into the Front-End without renaming during creation. Neither one of below forms is used as template. These forms may be modified without side effects on any other functionality except the form itself.

Form Name
Sealed Source Activity
Options
Backend Selector
Search
About
Datasheet

Below is a list of reports copied into the Front-End, without renaming during creation. These reports are of general use; they are used for displaying results of all reports and statistics from within RAIS. These reports may be modified without side effects on any other functionality except the display of reports itself.

Report Name
Report - Query – Portrait
Report - Query – Landscape
Report - Query – Flat Portrait
Report - Query – Flat Lanscape

.

In order for the custom forms to be created upon next run of the creator, it is necessary to modify the creator source code as described below:

- Open the RAIS Creator in design mode
- Locate the function [Public Sub FormCreateTemplates] in the module [RAIS Form Creator Functions]
- Include a line `DoCmd.CopyObject d, "destination form", acForm, " source form"`

In order for the custom reports to be created upon next run of the creator, it is necessary to modify the creator source code as described follows:

- Open the RAIS Creator in design mode
- Locate the function [Public Sub FormCreateTemplates] in the module [RAIS Form Creator Functions]
- Include a line `DoCmd.CopyObject d, "destination report", acReport, " source report"`

3.3 Copying tables

Only Propagator Tables and System Tables can be copied from the Front-End into the Creator because none of those tables has relationships to other tables, so that a simple copy operation even with records does not introduce data integrity failures. RAIS tables (generators, sources etc.) should never be copied from the Front-End into the creator.

Tables are most easily copied by a simple Drag-and-Drop operation from the Front-End into the Creator. If the table to be copied already exists in the Creator, MS Access will ask for a new name. This may easily be avoided by first deleting the table to be copied from the creator, as a new table from the Front-End is going to supersede that very table.

Please note that both Front-End and Creator need be opened in design mode in order to execute Drag-and-Drop operations. Also note that no renaming of destination objects is required when copying tables. Take care not to copy any linked tables from the Front-End into the Creator, do only copy internal tables, RAIS does not use any template tables.
To ensure custom tables, not made using the Creator, are reproduced on the next creator run, do the following:

- Locate the function [Public Sub FormCreatePDITable] in the module [RAIS Form Creator Functions]
- Include a line `DoCmd.CopyObject d, "destination table", acTable, "source table"`
- Locate the function [Public Sub CreatePDILinks] in the module [RAIS Database Creator Function]
- Include a line `CreatePDILink db, d, "source table"`

3.4 Copying modules

Copying modules from the Front-End into the Creator is most easily achieved by a simple Drag-and-Drop operation from the Front-End into the Creator. If the module to be copied already exists in the Creator, MS Access will ask for a new name. This may easily be avoided by first deleting the module to be copied from the creator, as a new module from the Front-End is going to supersede that very module.

Please note that both Front-End and Creator need be opened in design mode in order to execute Drag-and-Drop operations. Also note that no renaming of destination objects is required when copying modules, RAIS does not use any template modules.

Modify the RAIS 3.0 Creator for the new custom module to be created upon the next creation run:

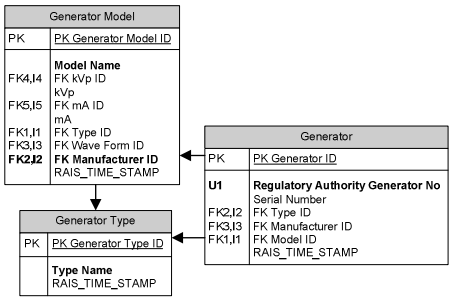
- Locate the function [Public Sub ModuleCreate] in the module [RAIS Module Creator Functions]
- Include a line DoCmd.CopyObject d, "destination module", acModule, "source module"
- Save the module

4 Entity Relationship Diagrams

The following Entity-Relationship Diagrams are based on the database model contained in the original distribution of RAIS, common to all official IAEA languages. Only the major entities (information items) and their relations are detailed in the following sections. The reader should be aware that these diagrams may vary, depending upon customizations of database tables with the RAIS Creator.

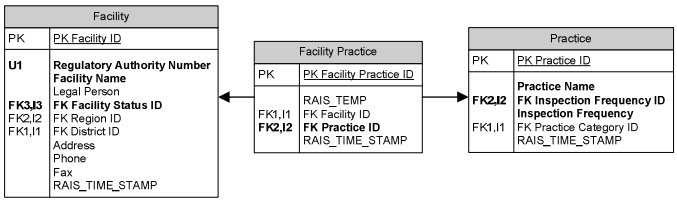
Following relationship structures are used in RAIS 3.0 database model:

1. Multiple (Double) path structure: as, for example in the following figure:



This structure allows for example to enter generator models, or generator manufacturer or both and correctly preserving their relationship. This feature contributes to the "reality attribute" of RAIS 3.0. i.e. the ability of dealing with incomplete data.

2. Junction tables: as in the following figure



Those tables provide for n-n relationships and correspond at the Front-End level to multiple selection fields. In RAIS 3.0 Creator, those fields are called "multiple lookup" fields.

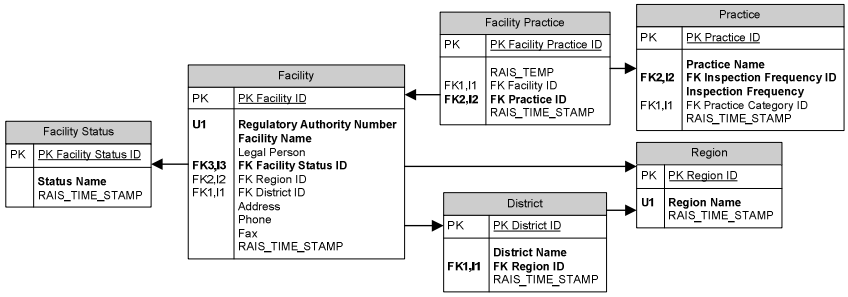
3. "Static" vs. "Dynamic" data: For many information items, e.g. sources, authorizations, inspections and workers, RAIS database model make a differentiation between data which are fixed attributes of the item itself, such as serial number or type, and data which change with time and are rather attributed to the status of the item in its workplace as for example source status or the stage of the authorization process. The former are called "static" and are stored in tables with no date reference while the later are called "dynamic" and are stored in "History tables".

Note that multiple history tables may exist for the same information item. This is the case, for example, for sealed sources. They have two history tables: [sealed history] and [sealed asso history].

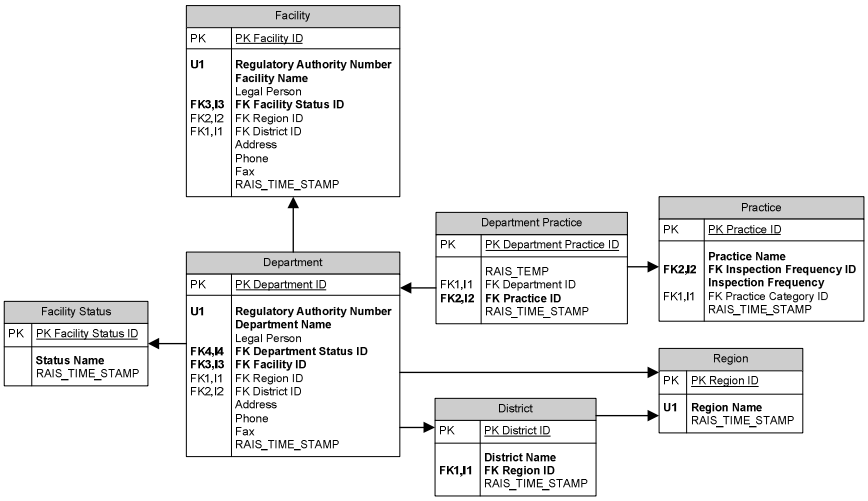
4. Authorization Types: are defined by relationship from the authorization table to a type-defining table (see section 4.3). Should authorization type specific data be necessary, then they are embedded in the particular type defining table. This is the case, for example, for import, export, transport and transfer authorizations.

4.1 Facilities and Departments

4.1.1 Facilities

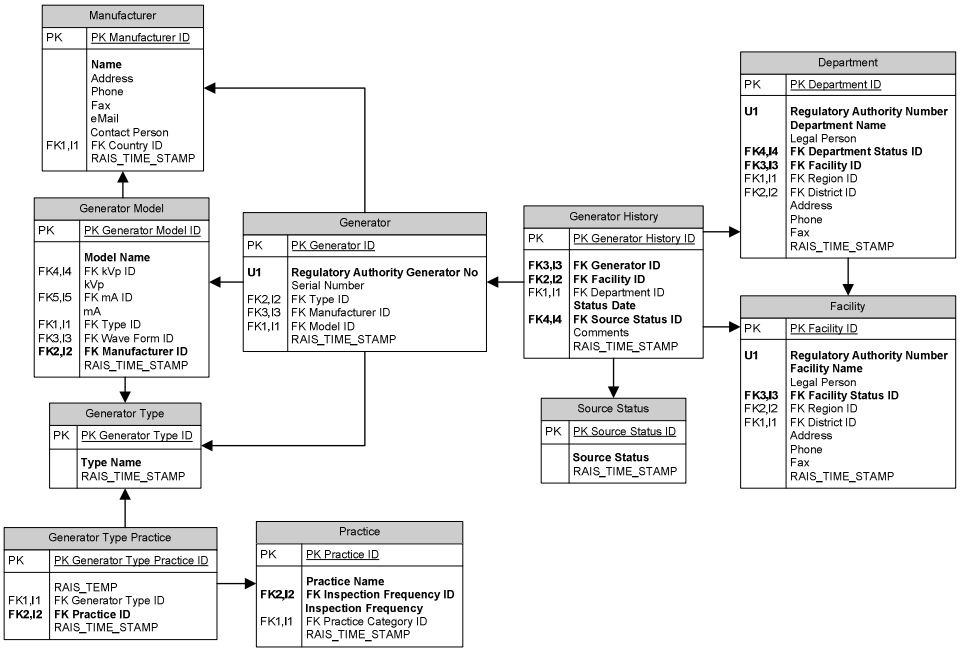


4.1.2 Departments

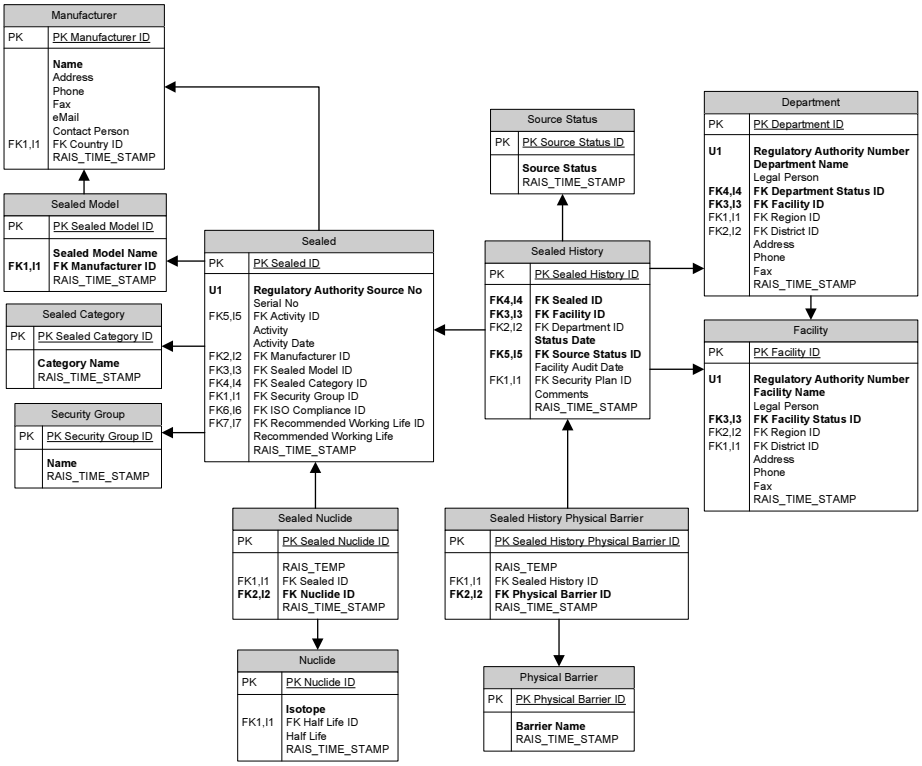


4.2 Sources

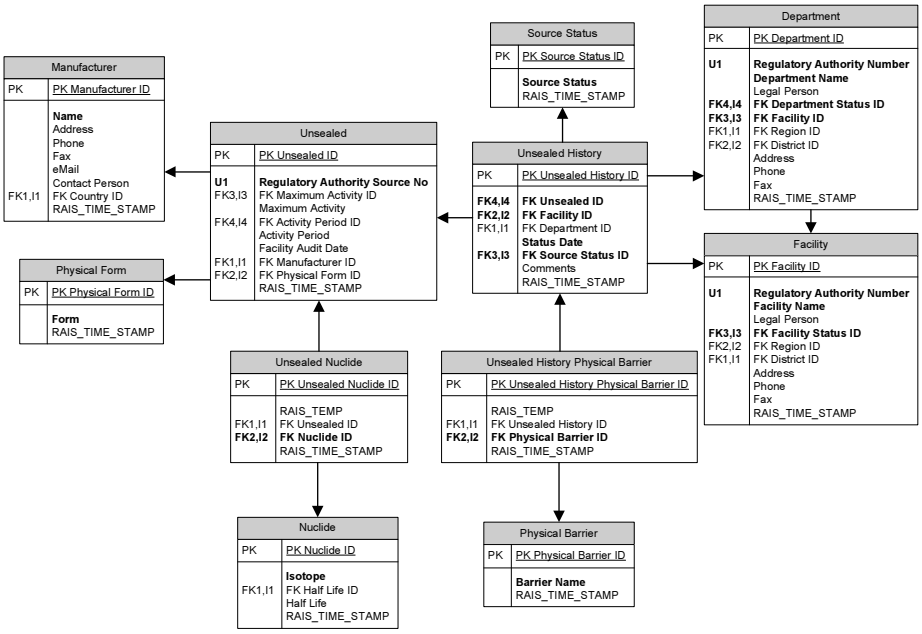
4.2.1 Radiation Generators



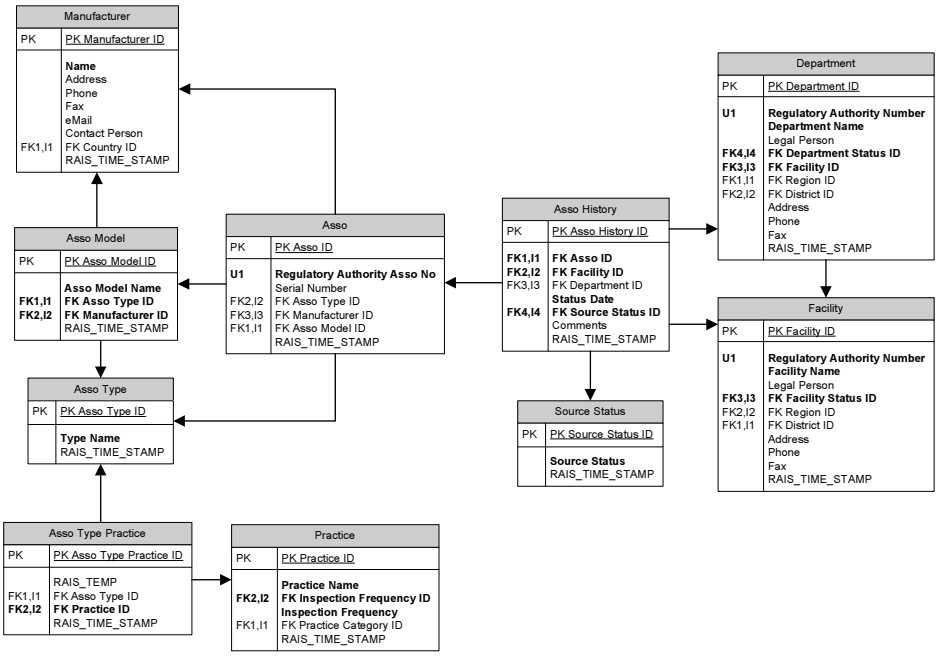
4.2.2 Sealed Sources



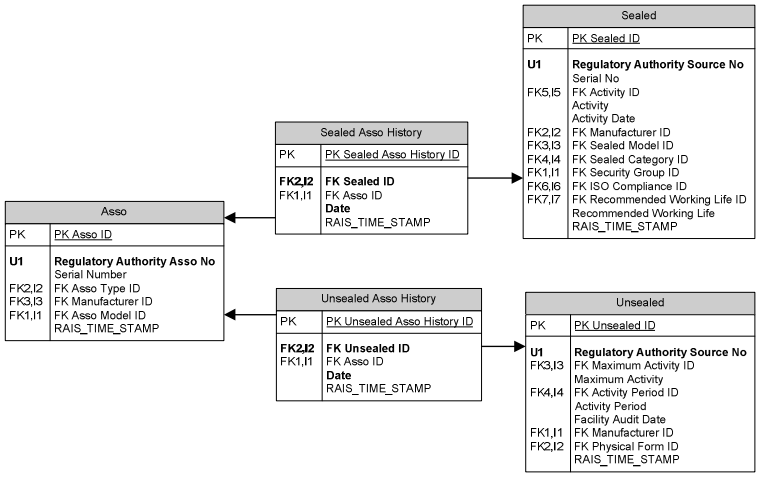
4.2.3 Unsealed Sources



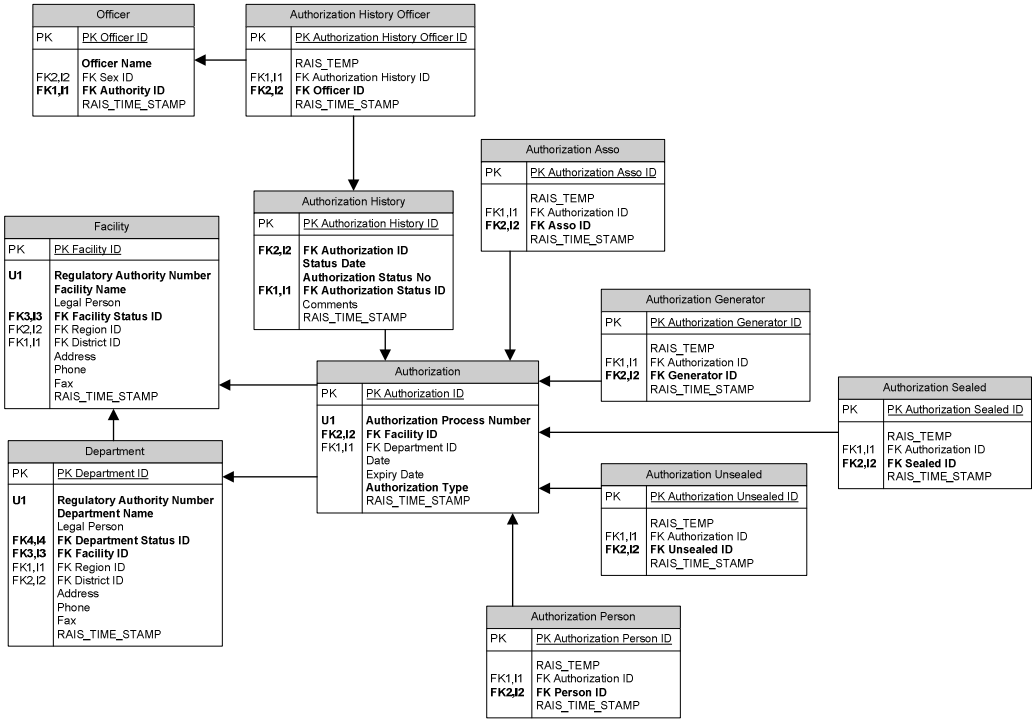
4.2.4 Associated Equipment



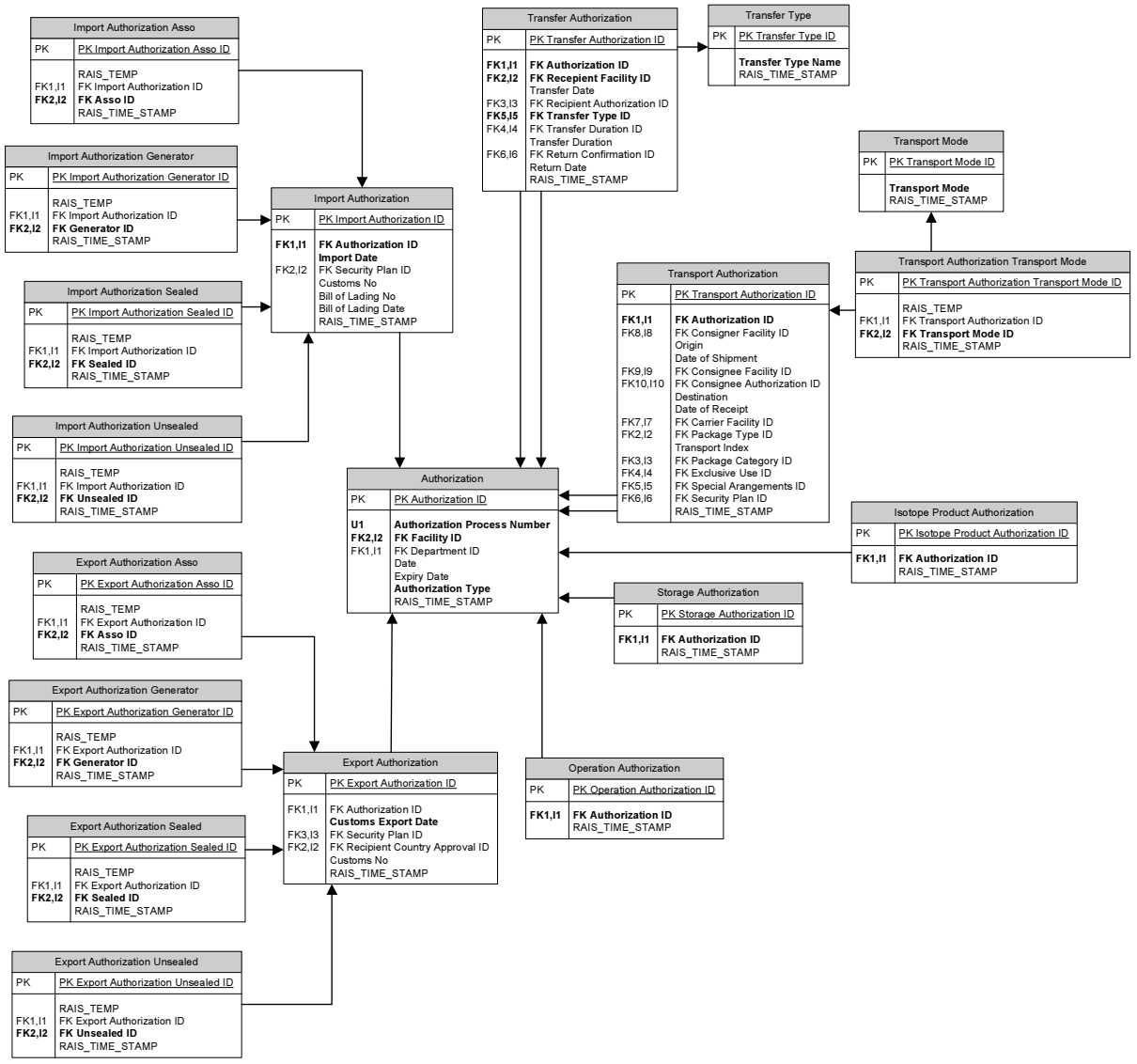
4.2.5 Source-Equipment Association



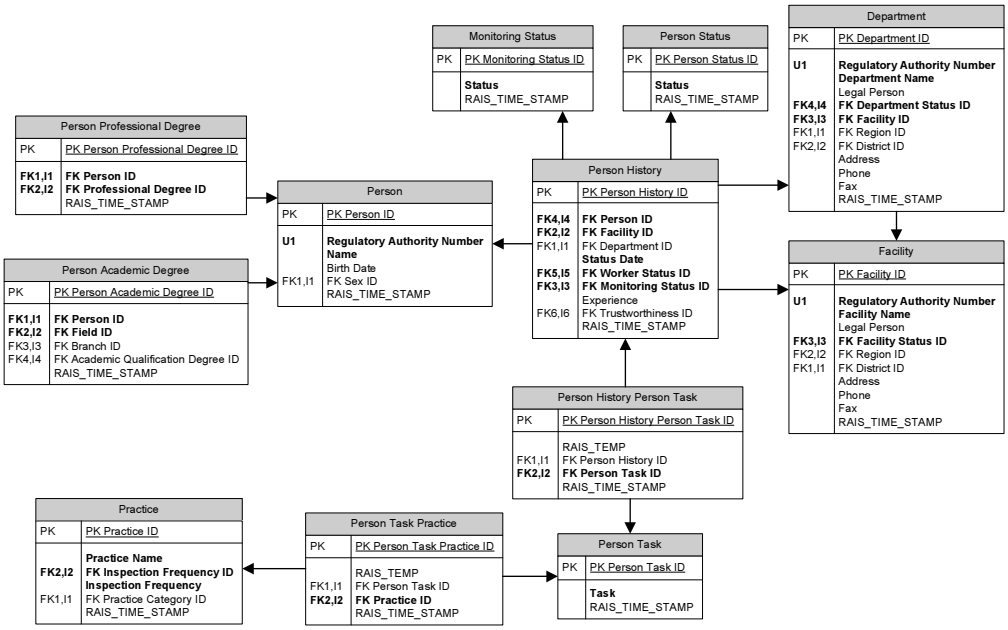
4.3 Authorizations



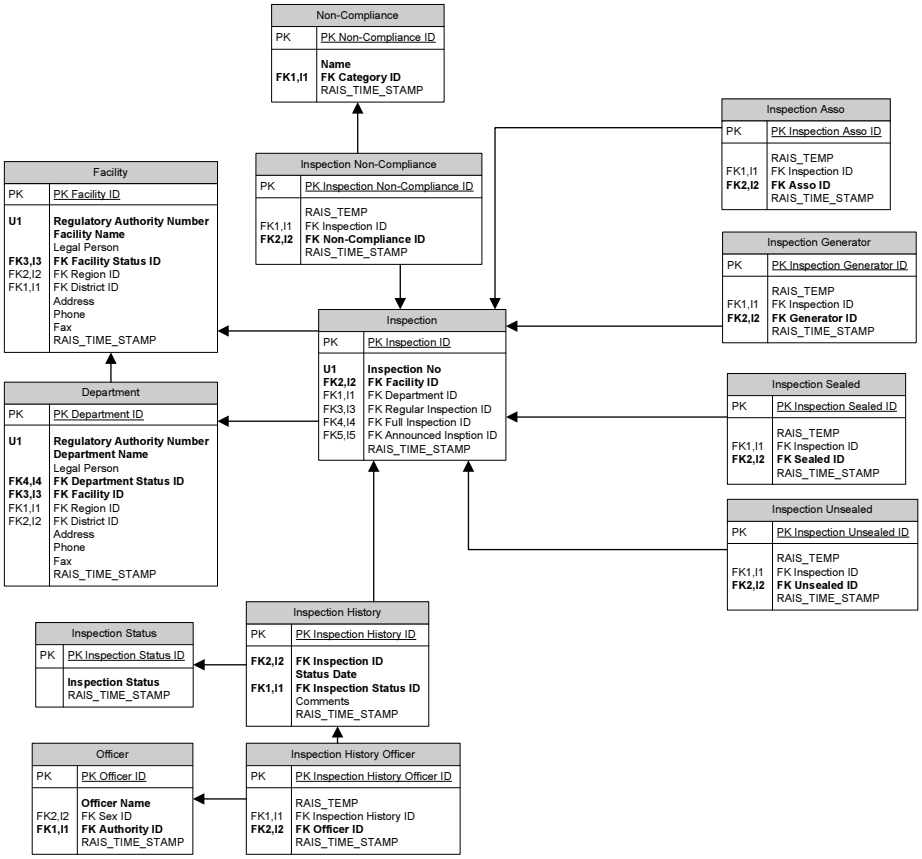
4.3.1 Authorization Types



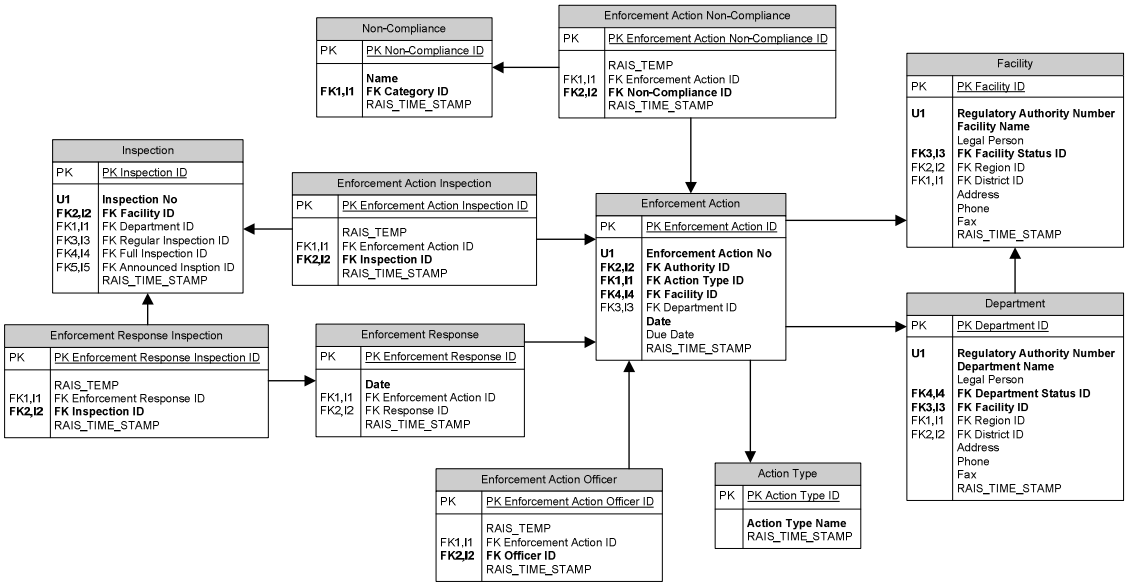
4.4 Workers



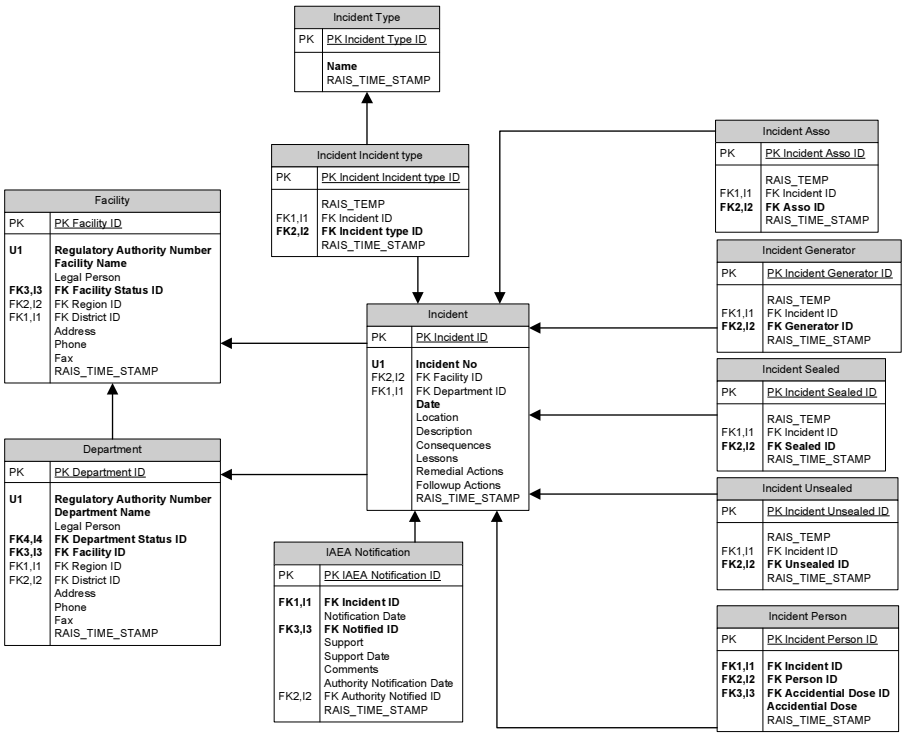
4.5 Inspections



4.6 Enforcements


Non-Compliance
PK PK Non-Compliance ID
FK1,I1 Name, FK Category ID, RAIS_TIME_STAMP
Enforcement Action Non-Compliance
PK PK Enforcement Action Non-Compliance ID
FK1,I1 RAIS_TEMP, FK Enforcement Action ID
FK2,I2 FK Non-Compliance ID, RAIS_TIME_STAMP
Facility
PK PK Facility ID
U1 Regulatory Authority Number, Facility Name, Legal Person
FK3,I3 FK Facility Status ID
FK2,I2 FK Region ID
FK1,I1 FK District ID, Address, Phone, Fax, RAIS_TIME_STAMP
Inspection
PK PK Inspection ID
U1 Inspection No
FK2,I2 FK Facility ID
FK1,I1 FK Department ID
FK3,I3 FK Regular Inspection ID
FK4,I4 FK Full Inspection ID
FK5,I5 FK Announced Insption ID
RAIS_TIME_STAMP
Enforcement Action Inspection
PK PK Enforcement Action Inspection ID
FK1,I1 RAIS_TEMP, FK Enforcement Action ID
FK2,I2 FK Inspection ID, RAIS_TIME_STAMP
Enforcement Action
PK PK Enforcement Action ID
U1 Enforcement Action No
FK2,I2 FK Authority ID
FK1,I1 FK Action Type ID
FK4,I4 FK Facility ID
FK3,I3 FK Department ID
Date, Due Date, RAIS_TIME_STAMP
Department
PK PK Department ID
U1 Regulatory Authority Number, Department Name, Legal Person
FK4,I4 FK Department Status ID
FK3,I3 FK Facility ID
FK1,I1 FK Region ID
FK2,I2 FK District ID, Address, Phone, Fax, RAIS_TIME_STAMP
Enforcement Response Inspection
PK PK Enforcement Response Inspection ID
FK1,I1 RAIS_TEMP, FK Enforcement Response ID
FK2,I2 FK Inspection ID, RAIS_TIME_STAMP
Enforcement Response
PK PK Enforcement Response ID
FK1,I1 Date, FK Enforcement Action ID
FK2,I2 FK Response ID, RAIS_TIME_STAMP
Enforcement Action Officer
PK PK Enforcement Action Officer ID
FK1,I1 RAIS_TEMP, FK Enforcement Action ID
FK2,I2 FK Officer ID, RAIS_TIME_STAMP
Action Type
PK PK Action Type ID
Action Type Name, RAIS_TIME_STAMP

4.7 Incidents


Incident Type
PK PK Incident Type ID
Name, RAIS_TIME_STAMP
Incident Incident type
PK PK Incident Incident type ID
FK1,I1 RAIS_TEMP, FK Incident ID
FK2,I2 FK Incident type ID, RAIS_TIME_STAMP
Incident Asso
PK PK Incident Asso ID
FK1,I1 RAIS_TEMP, FK Incident ID
FK2,I2 FK Asso ID, RAIS_TIME_STAMP
Facility
PK PK Facility ID
U1 Regulatory Authority Number, Facility Name, Legal Person
FK3,I3 FK Facility Status ID
FK2,I2 FK Region ID
FK1,I1 FK District ID, Address, Phone, Fax, RAIS_TIME_STAMP
Incident Generator
PK PK Incident Generator ID
FK1,I1 RAIS_TEMP, FK Incident ID
FK2,I2 FK Generator ID, RAIS_TIME_STAMP
Incident
PK PK Incident ID
U1 Incident No
FK2,I2 FK Facility ID
FK1,I1 FK Department ID
Date, Location, Description, Consequences, Lessons, Remedial Actions, Followup Actions, RAIS_TIME_STAMP
Incident Sealed
PK PK Incident Sealed ID
FK1,I1 RAIS_TEMP, FK Incident ID
FK2,I2 FK Sealed ID, RAIS_TIME_STAMP
Department
PK PK Department ID
U1 Regulatory Authority Number, Department Name, Legal Person
FK4,I4 FK Department Status ID
FK3,I3 FK Facility ID
FK1,I1 FK Region ID
FK2,I2 FK District ID, Address, Phone, Fax, RAIS_TIME_STAMP
Incident Unsealed
PK PK Incident Unsealed ID
FK1,I1 RAIS_TEMP, FK Incident ID
FK2,I2 FK Unsealed ID, RAIS_TIME_STAMP
IAEA Notification
PK PK IAEA Notification ID
FK1,I1 FK Incident ID, Notification Date
FK3,I3 FK Notified ID, Support, Support Date, Comments, Authority Notification Date
FK2,I2 FK Authority Notified ID, RAIS_TIME_STAMP
Incident Person
PK PK Incident Person ID
FK1,I1 FK Incident ID
FK2,I2 FK Person ID
FK3,I3 FK Accidential Dose ID, Accidential Dose, RAIS_TIME_STAMP

4.8 Service Providers